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Third Edition.

AN ATTEMPT
TO DEVELOP
THE LAW OF STORMS,
BY MEANS OF FACTS,
ARRANGED ACCORDING TO PLACE AND TIME,
AND
HENCE TO POINT OUT A CAUSE
FOR
THE VARIABLE WINDS,
WITH THE VIEW TO
PRACTICAL USE IN NAVIGATION.

BY LIEUT.-COLONEL W. REID, C.B., F.R.S.,
Corps of Royal Engineers.

LONDON:
J. WEALE, 59, HIGH HOLBORN.
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THE LAW OF STORMS,
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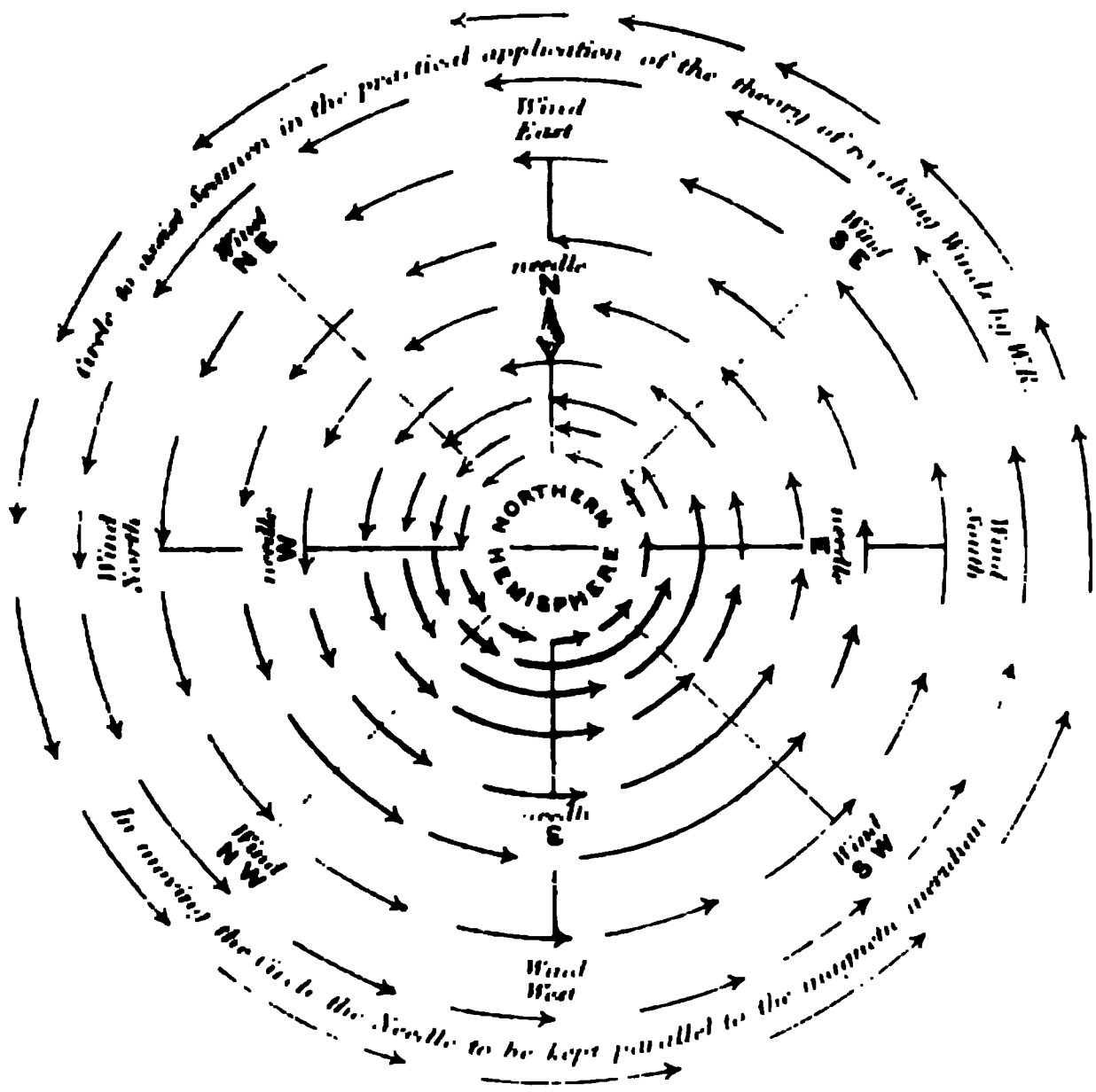

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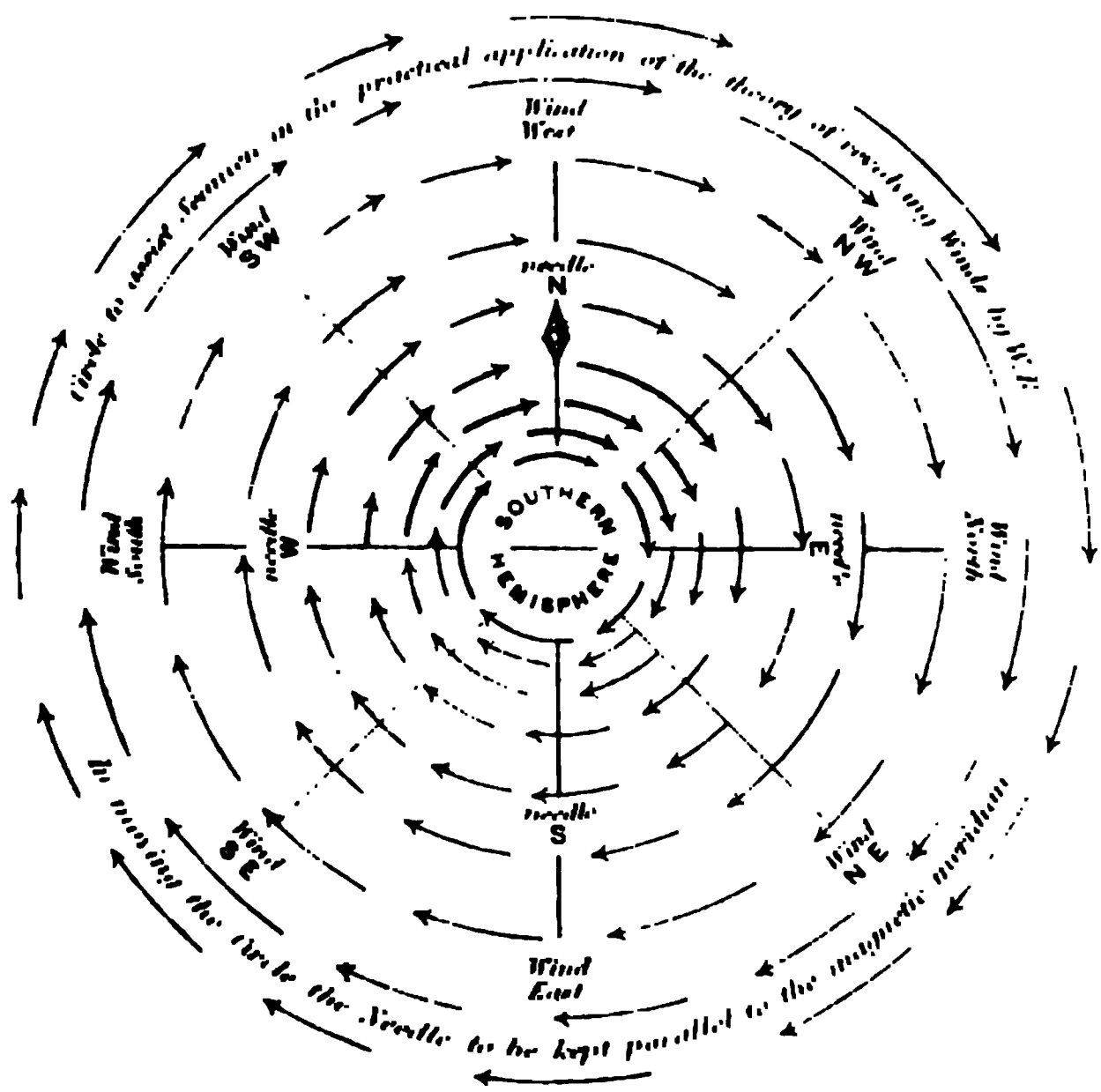

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WITH

THE PRACTICAL APPLICATION OF THE SUBJECT

TO

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ILLUSTRATED WITH CHARTS AND WOOD CUTS.

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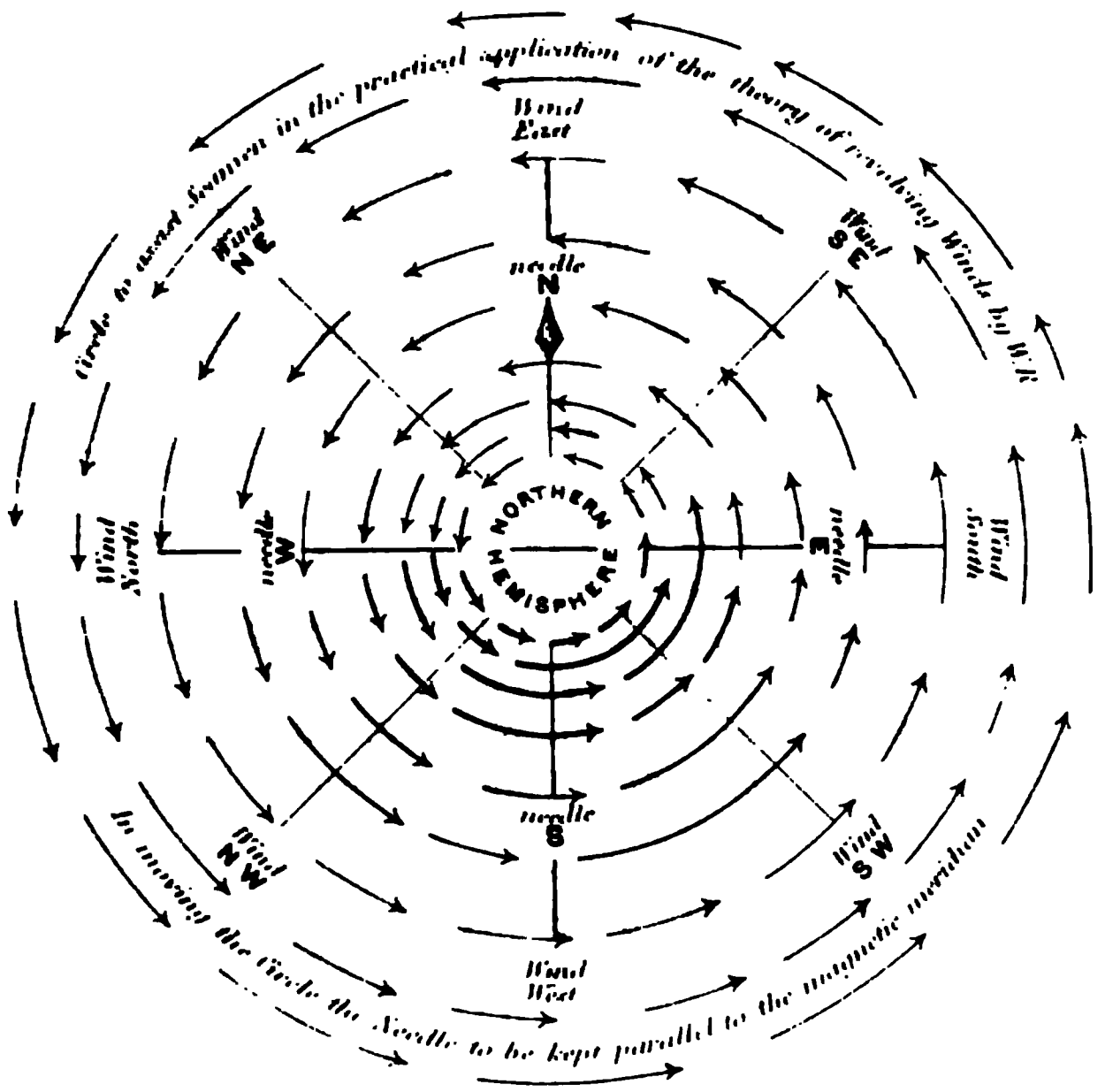

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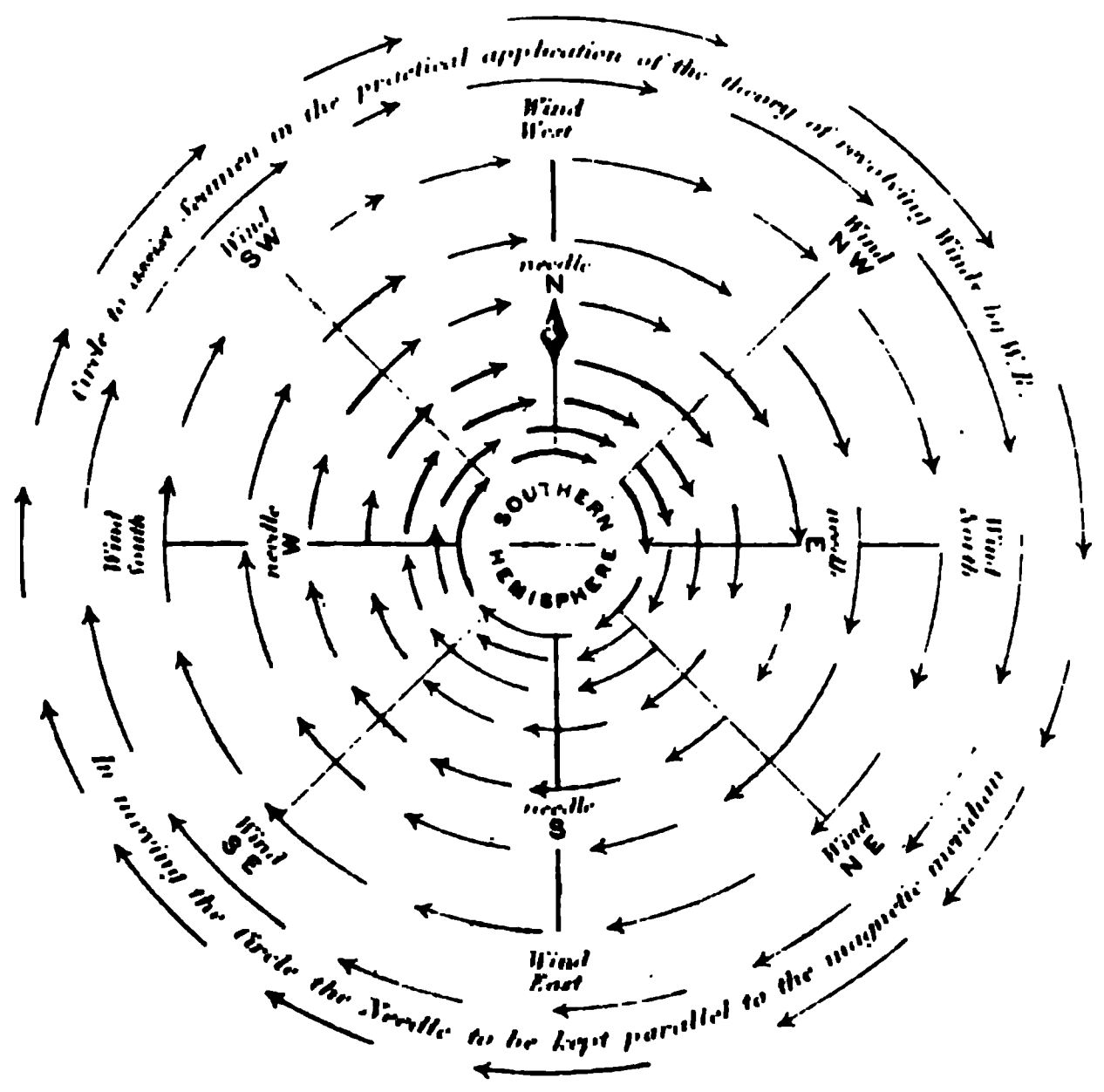

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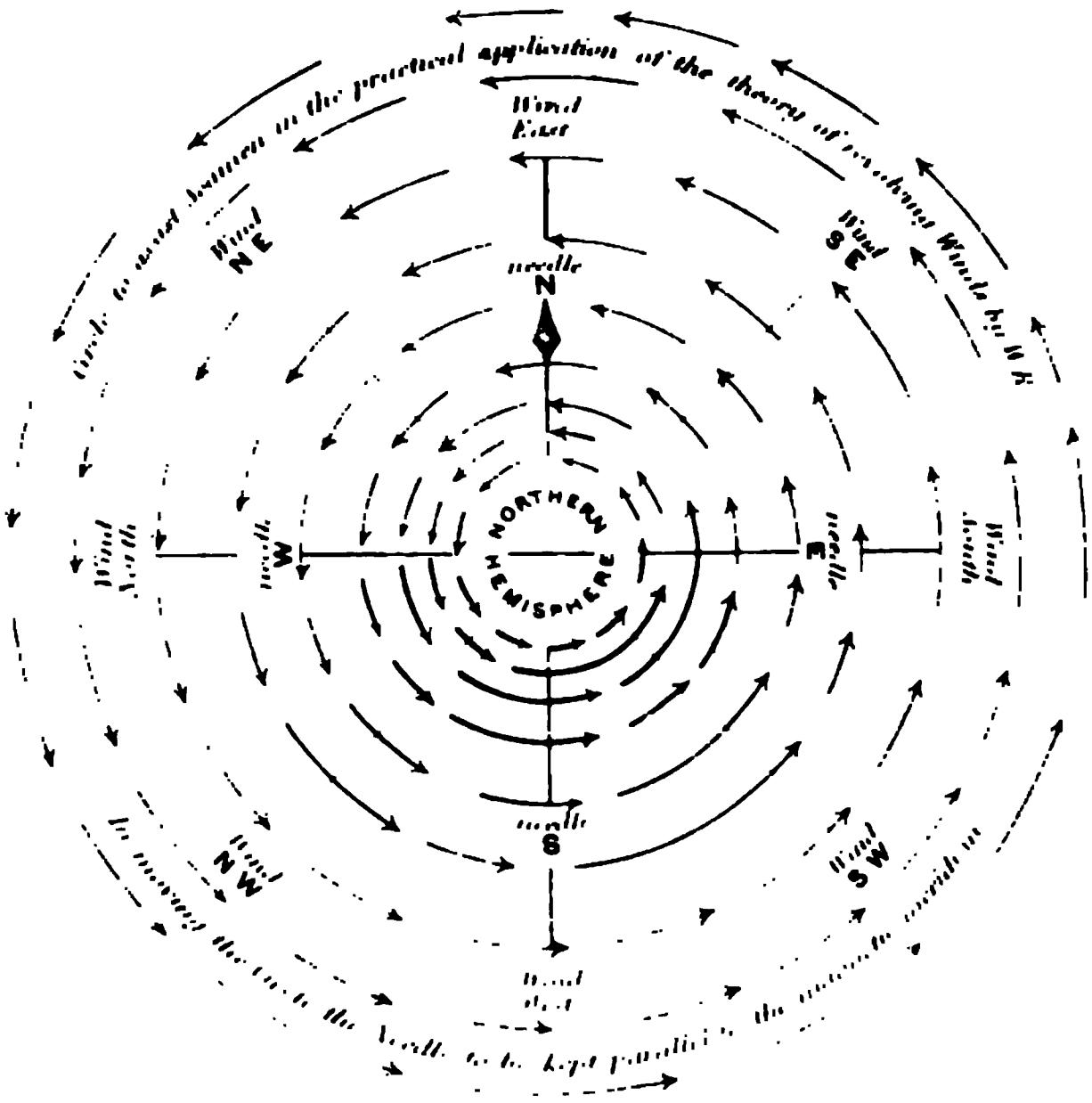

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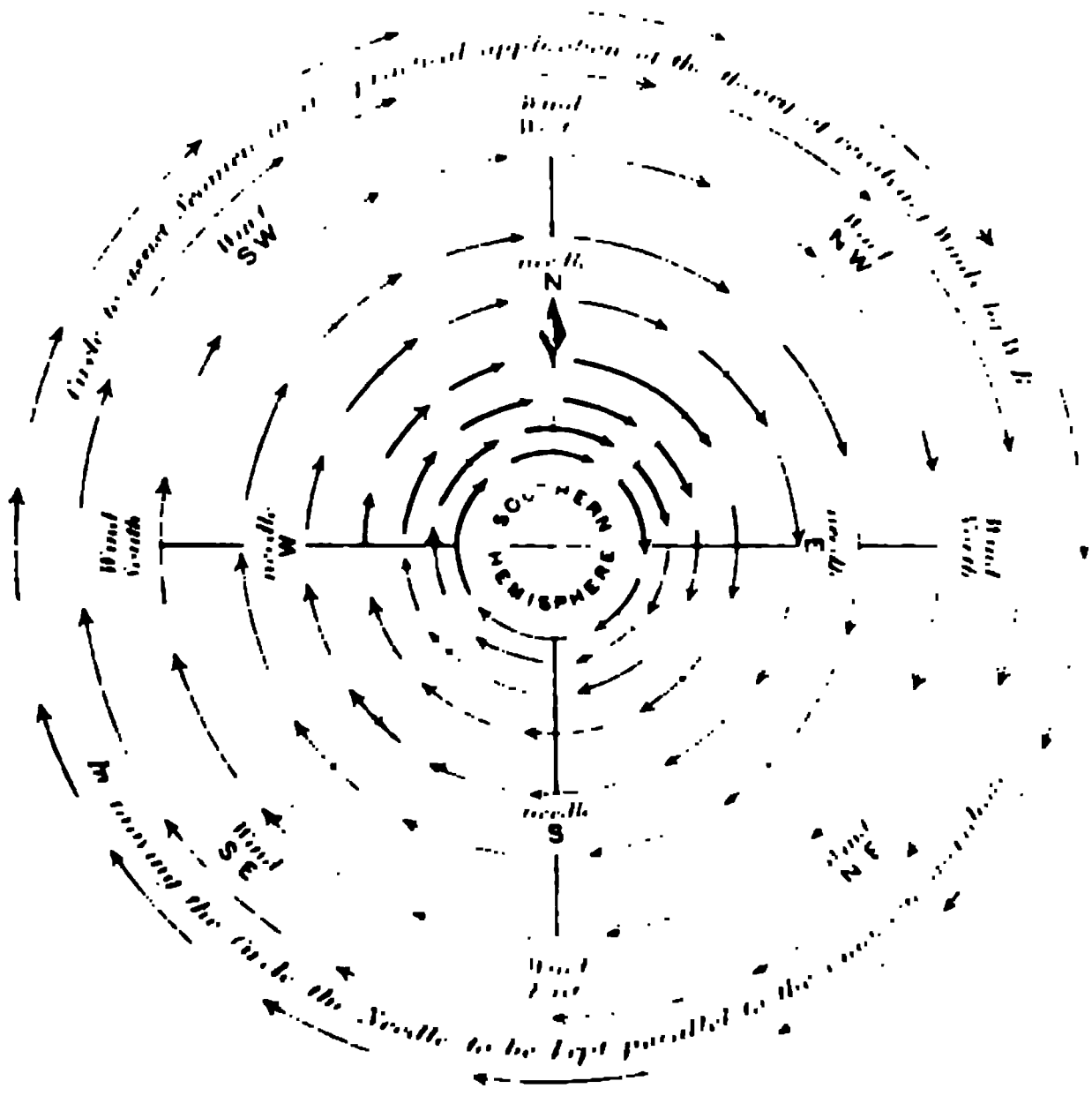

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The Second Edition of this Work being out of print, I republish it on account of the value I attach to the Log Books of Ships, and Narratives of Seamen, which formed the basis for "The Law of Storms."

W. R.

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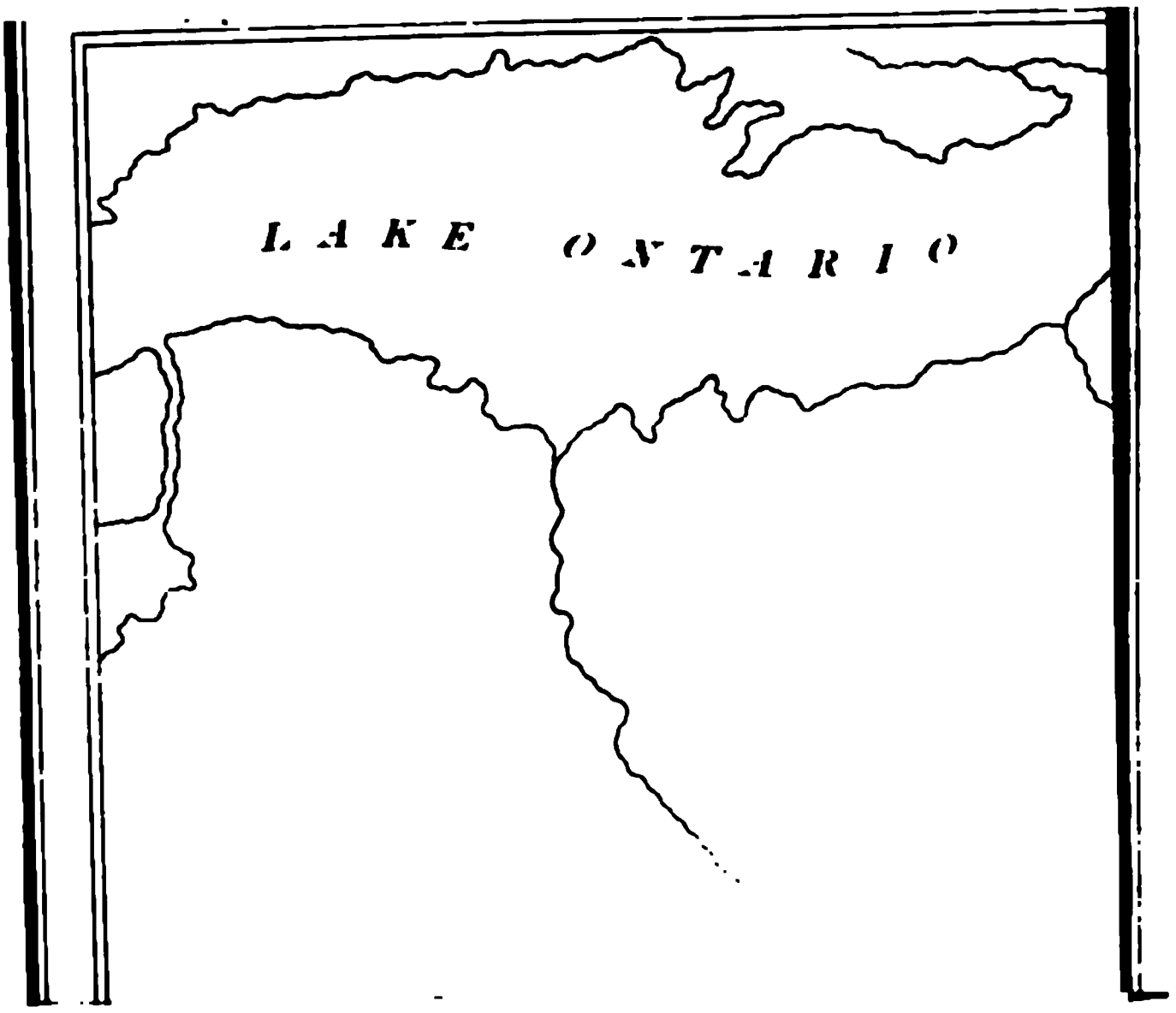

LAKE ONTARIO

ON

HURRICANES AND STORMS.

CHAPTER I.

AN INTRODUCTORY CHAPTER.

My attention was first directed to the subject of storms from having been employed at Barbados in re-establishing the government buildings blown down in the hurricane of 1831; when from the violence of the wind 1477 persons lost their lives in the short space of seven hours. I was induced to search every where for accounts of previous storms, in the hope of learning something of their causes and mode of action. West Indian histories, however, contain little beyond a record of the losses in lives and property, and the sufferings of the inhabitants, during the period of these tempests.

The first paper I met with, which appeared to convey any just opinion on the nature of hurricanes, was one published in the 'American Journal of Science,' by Mr. W. C. Redfield of New York.

Capper.

The late Colonel James Capper of the East India Company's Service, who published a work of the winds and monsoons in 1801, mentions some of the hurricanes which happened on the Coromandel Coast of India; but he merely reprints very brief statements

CHAP. I.

of their fatal effects from 'Orme's History of Hindostan.' The following passage is to be found in Colonel Capper's work:

"It would not, perhaps, be a matter of great difficulty to ascertain the situation of a ship in a whirlwind, by observing the strength and changes of the wind. If the changes are sudden, and the wind violent, in all probability the ship must be near the centre of the vortex of the whirlwind; whereas if the wind blows a great length of time from the same point, and the changes are gradual, it may be reasonably supposed the ship is near the extremity of it."

Redfield.

Mr. Redfield, living amidst the records of storms and shipwrecks, had actually done what Colonel Capper was satisfied with merely suggesting, and had come to the same conclusion, without being at all aware of what Colonel Capper had written; and he has also shown that they are progressive.

In one of the numbers of the 'American Journal of Science' above alluded to, in 1831, I found collected together many records of the same storms; and a chart on a very small scale, showing the progress of one of the storms.

Strongly impressed with the belief that Mr. Redfield's views were correct, I determined to verify them by making charts on a large scale, and on these laying down the different reports of the wind at points given in the 'American Journal of Science.' The more exactly this was done, the nearer appeared to be the approximation to the tracks of a progressive whirlwind. These are Charts I. and II. prefixed to this volume.

See Charts prefixed.

Since my object is not to propose a particular theory, but to endeavour to direct attention to the curious facts

I have collected and arranged (with some degree of labour), I shall do little more than print these as they are arranged, and set them before the public.

The facts are in themselves however full of interest; for the records best suited for the purpose are detailed accounts of the greatest storms, and the dangers to which seamen are exposed.

The barometer, as a measure for the atmospheric pressure, will appear more valuable than ever; and we have a new, and apparently the true, explanation of the cause of its fall in great storms.

A popular description of the barometer will be found at the end of the volume.

Variable winds.

We have at length a clue towards an explanation of the VARIABLE WINDS.

The quantity of electricity exhibited during tropical hurricanes is very great; and this part of the subject deserves great attention.

Many of the storms we call gales, certainly partake of the same nature as tropical hurricanes, and are rotatory; and so many of their courses pass over the same track, that the fact is remarkable. They seem to be carried towards the poles in some of the general returning atmospheric currents from the equator; and by tracing storms, it seems probable that we may learn something more than we at present know of these upper currents.

Franklin.

Franklin was aware, that what he called north-east storms came from the south-west; and the geographical position in which he was placed, probably contributed not a little to lead his inquiring mind to meteorological studies: for it will be seen by the annexed charts, that a great portion of the tropical storms which pass over

CHAP. I.

or near to the West Indies, change their direction, about the twenty-fifth degree of latitude, on approaching the coast of the American continent, and that they sweep along its eastern coast. Franklin died before he made the next step.

At New York the labouring people remark, that if the haze indicating a storm be first seen over Staten Island (or south-eastward), the wind will come from the *north-east;* but if the haze be seen first over the Jersey shore of the Hudson river (or westward), then the wind will come on from the *south-east.* It is also said to be a seaman's phrase, that a *north-wester* will never remain long in debt to a *south-easter.* The correctness of these observations, and the reasons for them, will be understood as we proceed.

In reading the observations, it will tend to make them more easily understood if figures like the following be constructed on paper and then cut out, so that they may be made to represent progressive whirlwinds.

The fleurs-de-lis in both figures point to the north. The first figure is intended to represent a whirlwind turning from right to left (supposing yourself in its centre), or in the contrary way to the hands of a watch. The letters in the diagram denote the points from whence the wind in the whirlwind blows.

In such a whirlwind as that represented by the uppermost circle, the wind on the northernmost portion of the circumference must be *east;* on the southernmost portion it must be *west;* on the westernmost portion it must be *north;* and on the easternmost portion it must be *south*—and it is necessary that this should be perfectly understood before proceeding further.

Such a whirlwind storm coming from the south, with its centre passing along the New Jersey side of the Hudson River, would place the city of New York

Proper North, Wind East.

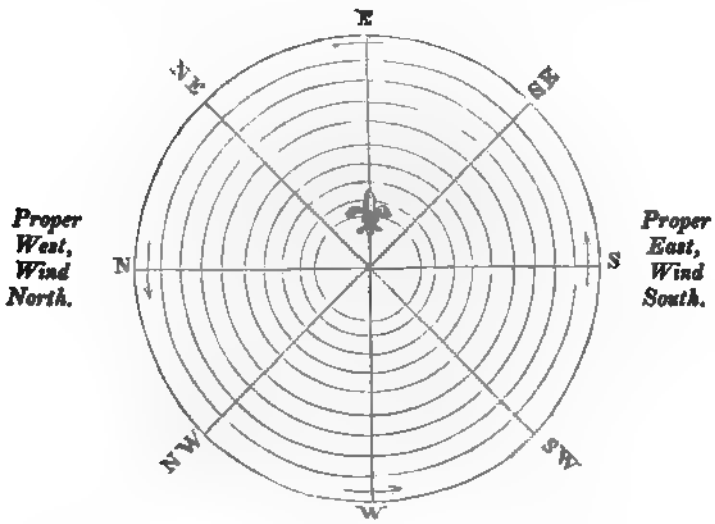


Figure for the Northern Hemisphere.

Proper West, Wind North.

Proper East, Wind South.

Proper South, Wind West.

Equator.

Proper North, Wind West.

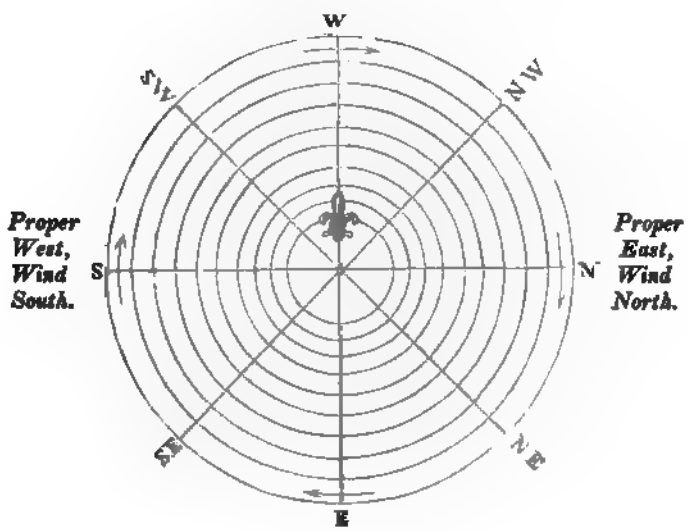


Figure for the Southern Hemisphere.

Proper West, Wind South.

Proper East, Wind North.

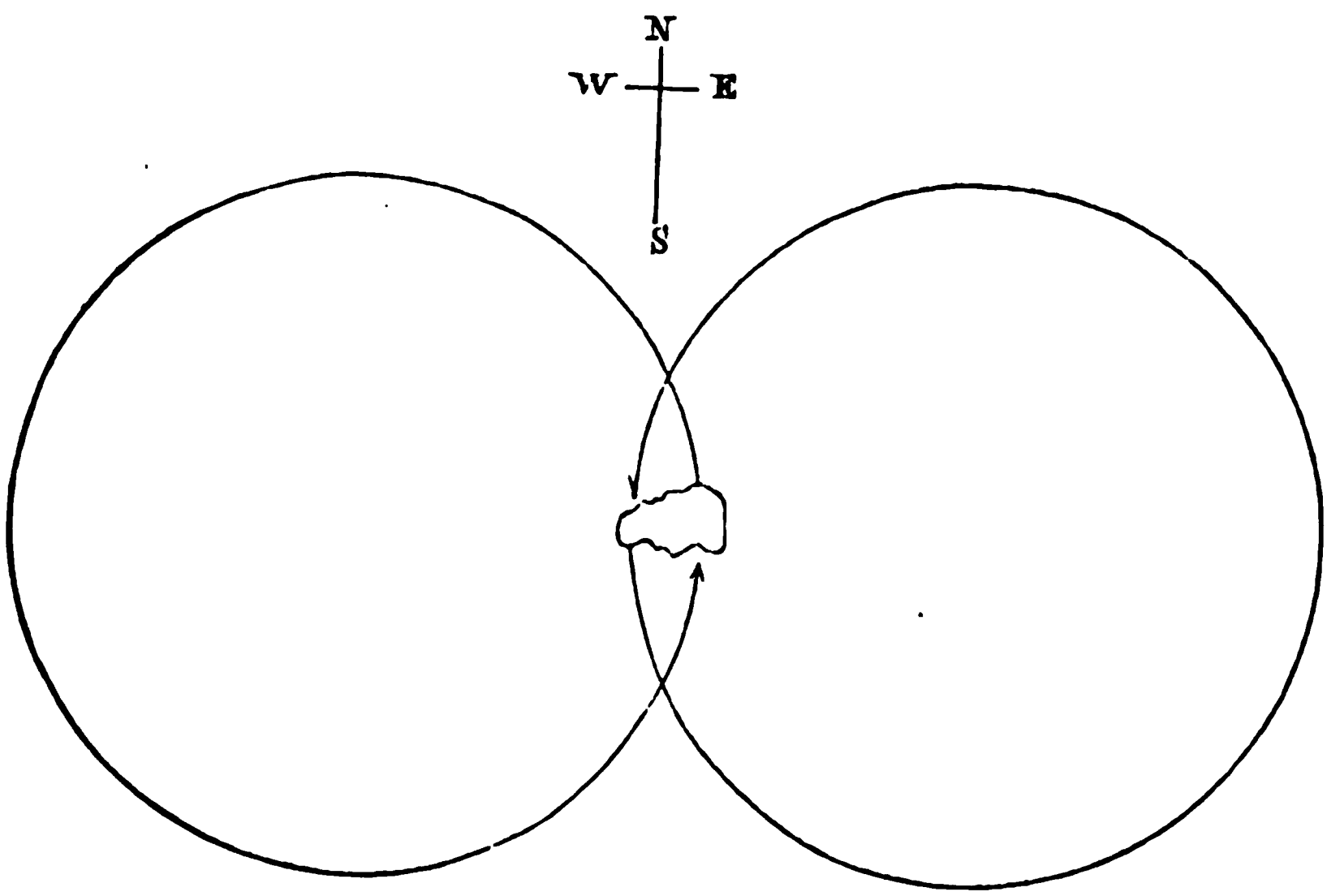
Proper South, Wind East.

CHAP. I.

in the right hand semicircle, and the wind there would commence at the southward of east; but if the centre of the storm were upon the sea and to the eastward of New York, as usually happens, then the inhabitants of that place would have a storm commencing at north-east: and such were Franklin's north-east storms.

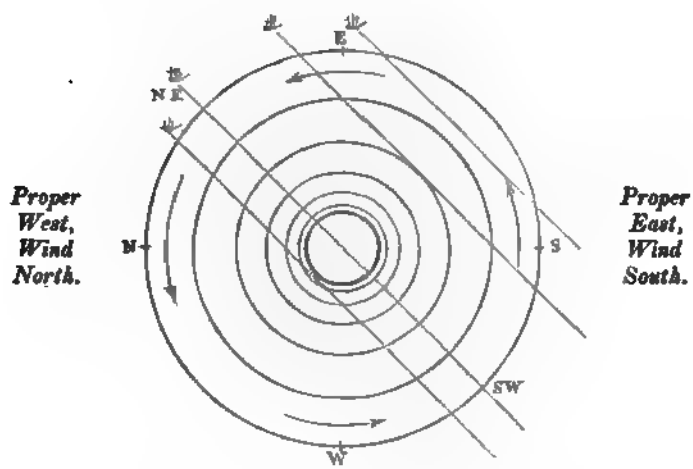
A glance at the plates will show, that in the latitude of New York, these gales come usually from the westward of south. If they begin at south-east they must end about north-west, which will be understood by a little careful examination of the moveable figure; and hence "the *north-wester* seldom remains long in debt to the *south-easter*." In the West Indies they come from the eastward, and proceed to the westward inclining northerly: and it is constantly remarked, that the severest hurricanes leave off blowing at the opposite point to which they commence.

The following figure shows that this will occur if they are progressive whirlwinds.



In the last figure, such a whirlwind coming from the eastward, is supposed to pass over an island in the middle of its course. The wind would at the commencement be nearly north; and it would be at the end nearly south. The direction of the wind is shown by the arrowed heads.

Proper North, Wind East.



Proper South, Wind West.

Lines drawn across concentric circles best explain the mode of veering of the wind in these storms; and (for those who may not recollect all the points) a figure of the mariner's compass will be found at the end of this chapter.

Thus in the preceding figure, a progressive whirlwind, turning in the opposite way to the hands of a watch, is supposed to pass over four ships. The wind will veer but little whilst the storm is passing over the ship most to the eastward. With this ship it will commence at east by south, and leave off at about south by east.

CHAP. I.

The next ship will be further within the centre of the whirlwind; with it the gale would commence at east by north, veering by the east to the south, and ending at south by west.

The fourth, or westernmost ship, would receive the wind first from the north-east by north, veering at first gradually to north; then more rapidly to north-west, and by degrees it will become west, and the storm will finish with the wind blowing somewhat from the south of west. The tempest will be furious whilst the wind is veering fastest; for the ship will then be near the centre of the storm: yet in the very centre there is a calm.

The ship in the figure over which the centre passes, will have the wind change but once. This ship will receive the wind at first from the north-east. If the vessel could be supposed to remain stationary and not to drift, the wind would blow over it in the same direction until the centre of the hurricane reached her. She would then have a calm; and after an interval of calm, she would have the wind as violent as before, but from the south-west; and there would be no other change of wind until the storm ended.

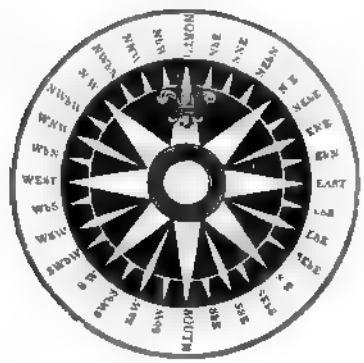
The gradual fall of the barometric column during the first part of these storms, and its gradual rise during the second part, will be found to be singularly regular; and the nearer a ship is to the centre the greater will be the fall.

The smaller whirlwinds and waterspouts appear to be phenomena of another kind from *the great storm.*

No part of the subject is more curious than the squalls and gusts; and their descriptions merit attentive consideration.

But by far the most interesting part of the subject is, that we have at length a clue towards an explanation of the VARIABLE WINDS.

THE MARINER'S COMPASS.



The direction of the wind as reported by ships, I understand to mean the magnetic direction. The dates are given both in civil and in nautical time. It would greatly facilitate such enquiries as the present if all log books were kept in civil time.

CHAPTER II.

STORMS TRACED BY REDFIELD.

CHAP. II.

CHARTS I. and II. are those which were constructed from the data published in the 'American Journal of Science;' these data are here annexed: for it is only by collecting together a number of facts relative to the same storm, and by arranging these facts, that we can hope to arrive at any knowledge of the mode of action of Nature in great storms. The reader is therefore invited to follow the reports step by step, comparing them with the projections on the plans, and correcting the projections where they may be faulty.

Charts prefixed.

By taking a general view, however, of Charts I. and II., before examining them in detail, it will be observed, that the arrows which indicate the direction of the wind, come from the southward on the right-hand side of the storm; and from the northward on the left-hand side.

Towards the centre of their courses, the arrows appear to fly both east and west; but on examining the reports in detail, it will be found, that as the storms came from the south and were proceeding to the north, the wind at the commencement of the gales was easterly, and at the end of them westerly.

Violent as these storms were, their rate of progress, on examining the dates, will be found to be no more

than the rate of the ordinary atmospheric currents, and are stated to be at from 7 to 15 miles an hour.

Hurricane of 1821. Trees blown in opposite direction.

One of the most remarkable facts recorded of the hurricane of 1821 is, that in the states of Massachusetts and Connecticut, the trees were blown down on the eastern portion of those states with their heads to the north-west; whilst those on the western portion were prostrated with their heads to the south-east.

Hurricane of 1830. Ship Illinois.

The progress of the ship Illinois on Chart II., and a letter from the master, deserve particular attention. It will be seen, that on the 15th of August, 1830, the swell caused by this storm, then to the southward of the ship, reached the vessel; but as the Illinois had a fair wind and was assisted by the Gulf-stream, whilst the storm made a detour towards Charleston and the coast of Georgia, the ship, for a day, outran the swell: on the 17th, however, the storm overtook her, blowing furiously from the *south;* whilst, at the same moment, it was unroofing houses at New York from the *north-east.*

Change of direction.

In following the course of this storm, it will be found in what a remarkable manner it suddenly changed its course on meeting the continent of America near Charleston. This will afterwards be found to be the case with most of the others which pass over the Bahama Islands, though not of all. It will be seen that they change their direction about the twenty-fifth degree of latitude.

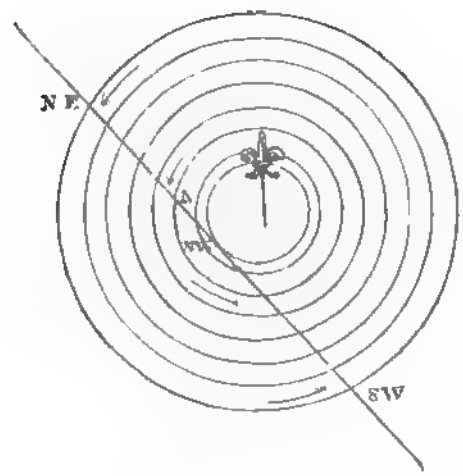
H. M. S. Blanche, 1830.

The Blanche, British frigate, commanded by Commodore Farquhar, having been in the hurricane of 1830, I procured her log from the Admiralty; and I have laid down her track from the time she was off Cuba until her arrival at Halifax. The first part of

CHAP. II. the log is printed in this chapter; the latter part will be printed in its proper place further on.

A diagram is given to explain the manner in which this storm most probably passed over the Blanche. This direction is marked by a line cutting the concentric circles in the figure; and the veering of the wind, as given in the log, may be read off along this line, from the time when it began at N.E., until it became S.W.

See log, page 22.



But a ship in her situation must have been affected, and carried on by the current of the Gulf-stream; and when the frigate made sail, she no doubt kept up with, and kept within the influence of what seamen call the tail of the hurricane. The storm at this period going towards the north-west, the Blanche was left in the eastern half-circle, and therefore had for a time a southerly and fair wind for Halifax.

Ship Britannia, 1830.

The place of the ship Britannia is also marked on Chart II. This vessel left New York on the evening of the 16th, with fine weather. On the night of the 17th she met the hurricane, having the wind first at N.E., then E.N.E., and after midnight she had the wind from S.E. Her course being towards England, she probably crossed the centre of the whirlwind storm's track.

Data on which Chart I. is constructed.

Hurricane of 1821.

"The earliest supposed trace of this hurricane which has been obtained, is from off Turk's Island in the West Indies, where it appeared on the 1st of September, 1821, two days previous to its reaching our coast. It was felt there severely, but at what hour in the day we are not informed.

"The next account we have is from lat. 23° 43′, where the storm was severe on the 1st September, from south-east to south-west. Whether these two accounts are considered as identifying the storm, or otherwise, will not at this time be deemed material.

"Our next report is from lat. 32° 30′, long. 77° from Greenwhich, on the night of the 2nd of September, a hurricane for three hours.

"At 3 A.M. on the 3rd of September, a severe gale was experienced 30 miles outside of the American coast, off Wilmington, N. Carolina.

"At Wilmington there was no gale.

"At Ocracock Bar, N. C., at daylight on the morning of the 3rd, a severe gale from E. S. E.

"At Edenton, N.C. the gale was at N.E.

"Off Roanoke, on the morning of the 3rd September, a dreadful gale at E.: then S.W. and N.W.

"A vessel from Charleston, S. Carolina, two days previous to arriving in the Chesapeake, experienced the gale at 4 A.M. on the 3rd, from S.E. to W.S.W.

"A vessel from Bermuda experienced the gale from the westward, on the inner edge of the Gulf-stream.

"Another vessel from Charleston did not experience the gale.

"In lat. 37° 30′, on the inner edge of the Gulf-stream, gale from the westward with squalls.

CHAP. II.

Hurricane of 1821.

"On James' River, Virginia, the gale was severe from the N.W.

"At Norfolk, Virginia, the gale raged on the 3rd for five hours, from N.N.E. to N.N.W., and terminated at the latter point: greatest violence at 10 A.M. to 1 P.M.

"At sea, forty miles north of Cape Henry, severe at S.E. changing to N.W.

"Off Chincoteague, coast of Maryland, gale from the S.E. on the 3rd.

"At Snowhill, Maryland, gale commenced at 11 A.M.

"In lat. 38° 30′, long. 74° 30′, gale S. by E.

"A ship from Boston, bound to Norfolk, experienced nothing of the gale. On the 3rd was in lat. 40° 19′, weather foggy, and light winds from S.E.

"At Morris River, Jersey, the gale was E.S.E.

"No hurricane was felt at Baltimore.

"At Cape Henlopen, Delaware, the hurricane commenced at half-past eleven A.M. from E.S.E.; shifted in twenty minutes to E.N.E., and blew very heavy for nearly an hour. A calm of half an hour succeeded, and the wind then shifted to the W.N.W., and blew, if possible, with still greater violence.

"At Cape May, New Jersey, commenced at N.E. at 2 P.M. and veered to S.E. and blew with violence; after abating fifteen minutes, it again blew with increased violence for two hours, and then abated. The sun set clear with pleasant weather; at which time not a cloud was to be seen in the *western* horizon.

"At Bombay Hook, near the mouth of the Delaware River, the gale blew from the N.N.E. and W.N.W.

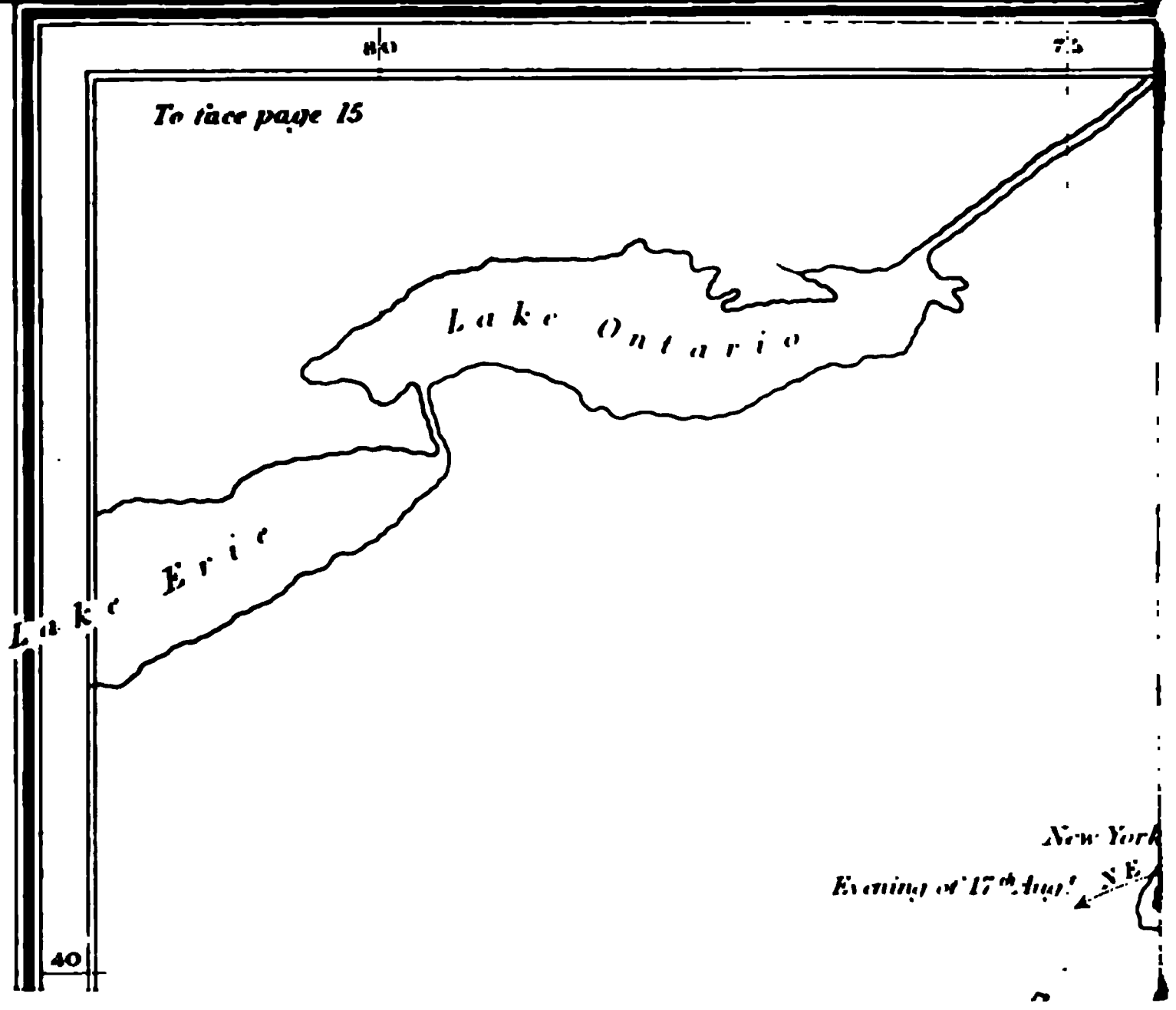
"At sea, forty miles N.E. of Cape May, the gale was at S.E., and lasted eight hours.

"At Philadelphia, the storm commenced at 1 P.M. on the 3rd from the N.E., and raged with great violence from N.E. to N.W. during the greater part of the afternoon.

"At Trenton, New Jersey, the gale commenced at 3 P.M. with the wind at N.E.

"In lat. 39° 20′, long. 73° 30′, the gale blew from the E.S.E. and S.S.E., and lasted eight hours.

"At New York, the gale was from N.E. and E., and commenced blowing with violence at 5 P.M.; continued with great fury for three hours, and then changed to the W. More damage was sustained in two hours than was ever before witnessed in the city; the wind increasing in the afternoon. *The wharves were*


80
75
To face page 15
Lake Ontario
Lake Erie
New York
Evening of 17th Aug.
S.E.
40

Hurricane of 1821.

overflowed, rising thirteen feet in one hour. Previous to the gale the wind was from S. to S.E., *but changed to* N.E. at the *commencement of the storm,* and blew with great fury until the evening, and then shifted to the westward.

"At the Quarantine, Staten Island, the wind was reported at E.S.E.; other accounts fix it at E.

"At Bridport, Connecticut, the gale commenced violent at S.E. at 6 P.M., and continued until 9 P.M., then shifted to N.W., and blew until nearly 11 P.M.

"At New London, the gale was from 7 P.M. until midnight.

"At Middleton, Connecticut, violent from S.E. for five hours.

"At Springfield, Massachusetts, violent from 9 to 12 P.M., then changed to the westward,

"At Northampton, at S.E. on the same evening.

"At Worcester, Massachusetts, in the night between the 3rd and 4th September.

"At Boston, the gale commenced at 10 P.M., but was not severe. At the time the storm was raging with its greatest fury at New York, the inhabitants of Boston were witnessing the ascent of a balloon, and the aëronaut met with little or no wind.

"The general course of this storm, northward of Cape Hatteras, appears to have been S.S.W. and N.N.W.; and of its further progress we are uninformed."—*American Journal of Science,* vol. xx. p. 24.

Data on which Chart II. is constructed.

Hurricane of 1830.

"This storm, or hurricane, was severe at the Island of St. Thomas, on the night between the 12th and 13th of August, 1830.

"On the afternoon of August 14, and the succeeding night, it continued its course along the Bahama Islands, the wind veering almost round the compass during the existence of the storm.

"On the 15th of August the storm prevailed in the Florida channel, and was very disastrous in its effects.

"In lat. 26° 51′, long. 79° 40′, in the Florida stream, the gale was severe on the 15th, from north-north-east to south-west.

"Late on the 15th, off St. Augustine (Florida), in lat. 29° 58′, long. 80° 20′, the gale was very severe.

"At St. Andrew's, twenty miles north of St. Mary's (Georgia), from 8 o'clock P.M. on the 15th, to 2 A.M. on the 16th, the storm

CHAP. II.

Hurricane of 1830.

was from an eastern quarter, then changed to south-west, and blew till 8 A.M.

"Off Tybee, and at Savannah (Georgia), on the night of the 15th, changed to north-west at 9 A.M. on the 16th, and blew till 12 M.

"At Charleston (S.C.) on the 16th, the gale was from the south-east and east, till 4 P.M., then north-east, and round to north-west.

"At Wilmington (N.C.), the storm was from the east, and veered subsequently to the west.

"In the interior of North Carolina the storm was felt at Fayetteville.

"In the vicinity of Cape Hatteras, at sea, the storm was very heavy from the south-east, and shifted to north-west.

"A vessel bound from New York to Hayti, in the middle or outer part of the Gulf-stream, about lat. 33°, long. 72°, experienced the gale moderately from the south-west and south-south-west, but with a heavy sea from a very westerly direction, and is supposed to have been on the outer margin of the storm.

"Another vessel, at about the same distance from the coast, experienced similar effects.

"Early on the morning of the 17th the gale was felt severely at Norfolk, and also in Chesapeake Bay, from the north-east.

"Off the Capes of Virginia, on the 17th, in lat. 36° 20′, long. 74° 2′, 'a perfect hurricane,' from south to south-south-east, from 5 A.M. to 2 P.M., then shifted to north-west.

"On the 19th, in lat. 37° 30′, long. 74° 30′, near the east of Virginia, the gale was severe at east-north-east, and changed to west-north-west.

"Off Chincoteague (Md.), precise distance from the coast unknown, the gale was severe between south-south-east and north-north-east.

"Off the coast of Delaware, in lat. 38°, long. 72°, 'tremendous gale,' commencing at south-east at 1 P.M. on the 17th, and blowing six hours, then changed to north-west.

"At Cape May (N.J.), the gale was north-east off Cape May, in lat. 39°, long. 74° 15′; heavy gale from east-north-east on the afternoon of the 17th of August.

"Near Egg Harbour, coast of New Jersey, the gale was heavy at north-east on the same afternoon.

"Off the same coast, in lat. 39°, long. 73°, the gale was at east-north-east.

Hurricane of 1830.

"In the same latitude, long. 70° 30′, 'tremendous gale,' commencing at south-south-east and veering to north.

"At New York and on Long Island Sound the gale was at north-north-east, and north-east on the afternoon and evening of the 17th.

"Off Nantucket Shoals, at 8 P.M., the gale commenced severe at north-east by east.

"In the Gulf-stream, off Nantucket, in lat. 38° 15′, long. 67° 30′, on the night of the 17th, 'tremendous hurricane,' commencing at south, and veering with increasing severity to south-west, west, and north-west.

"At Elizabeth Island, Chatham, and Cape Cod, Massachusetts, the gale was severe at north-east, on the night between the 17th and 18th of August.

"On the 18th, heavy gale from north-east at Salem and Newbury Port, Massachusetts.

"Early on the 18th, in lat. 39° 51′, long. 79°, severe gale from south-east, suddenly shifting to north.

"In lat. 41° 20′, long. 66° 25′, 'tremendous hurricane' from north-north-east on the 18th of August.

"On the night of the 18th, off Sable Island, and near the Porpoise Bank, in lat. 43°, long. 59° 30′, 'tremendous gale' from south and south-west, to west and north-west.

Rate 17 miles an hour.

"In lat. 43°, long. 58°, severe gale from the south; the manner of change is not reported. This remarkable storm appears to have passed over the whole route comprised in the foregoing sketch in about six days, or at an average rate of about seventeen geographical miles per hour.

Lasted from 7 to 12 hours.

"The duration of the most violent portion of the storm, at the several points over which it passed, may be stated at from seven to twelve hours.

Diameter 500 miles.

"The general width of the tract, influenced in a greater or less degree by the gale on the American coast, is estimated to have been from five to six hundred miles.

"Width of the hurricane portion of the track or severe part of the gale, one hundred and fifty to two hundred and fifty miles.

"Semidiameter of the hurricane portion of the storm, seventy-five to one hundred and twenty-five miles.

"Rate of the storm's progress from the Island of St. Thomas to Providence Island, Bahamas, fifteen nautical miles per hour.

CHAP. II.

Hurricane of 1830.

"Rate of progress from Providence to St. John's, Florida, sixteen miles per hour.

"From St. John's to Cape Hatteras, North Carolina, sixteen and a half miles an hour.

"From Cape Hatteras to Nantucket, on the south-eastern coast of Massachusetts, eighteen miles per hour.

"From Nantucket to Sable Island, off the south-eastern coast of Nova Scotia, twenty miles per hour."

Extract of a letter from the Master of the ship Illinois.

Master of Illinois' letter.

"I sailed from New Orleans on the 3rd of August, bound to Liverpool.

See Chart II.

"Nothing worth notice occurred until the 15th of August, in lat. 33° N., long. 77° W., when there was a very heavy swell from the south, more than I had ever experienced before in this part, unless preceded by heavy gales. We had no indication of wind at this time, but there was a dull and heavy appearance in the south. During the day the wind was light and at south-east, at night it shifted to south-south-west.

"On the 16th it was a fresh wholesome breeze; so that with the help of the Gulf-stream we ran at a great rate, steering north-east, and at noon we were in lat. 36°, long. 73°.

Heavy appearance in South.

"The 17th the wind continued steady at south-south-west, blowing a strong wholesome breeze, but *the appearance to the south continuing dull and heavy;* the sea was smooth again, and we seemed to have outrun the southerly swell. At noon, lat. 37° 58′, long. 69° 23′, we were still continuing to run about the course of the Gulf-stream. The temperature of the water was 86°. On the first part of the 18th (afternoon of the 17th current time*) the wind backed to south, and began *to freshen in very fast;* some heavy clouds arising in the south-west with flashes of lightning in that quarter. At 8 P.M. the wind had increased to a strong gale: the weather at this time had an unusual appearance, but still it did not look bad.

Wind backed.

Prepared for bad weather.

"At 10 the wind had increased, and we took in our sails, and prepared for the worst.

"At 11 o'clock the sea ran high *and cross,* which induced me to heave the ship to, under a close-reefed topsail.

"At half-past 12, midnight, all was darkness; the heavy

* *Civil time.*

Hurricane of 1830.

clouds which had been rising in the south-west had overtaken us; the rain fell in torrents, and the lightning was uncommonly vivid; the wind had, in the space of an hour, increased from a moderate gale to a perfect hurricane.

"At half-past 1 A.M. it began to veer to the westward.

"At 3 A.M. it was west, and rather increased in violence as it shifted.

"At daylight *the sky was clear*, but the gale, if anything, rather increased in its fury; the sea was tremendous, and ran in every direction.

"At 7 the wind had got to the north-west, and at 9 it began to abate a little.

"I have only to add, that from an experience of twenty or thirty years, during which time I have been constantly navigating the Atlantic, my mind is fully made up that heavy winds or hurricanes run in the direction of whirlwinds.

"Believe me, &c.,

(Signed) "ROBERT WATERMAN."

The Blanche's place at noon on the 12th will be found on Chart II. At midnight the weather is stated in her log-book as being "*calm* and cloudy."

Blanche's Log.

Extract from the Log of H.M.S. BLANCHE, Commodore Farquhar, kept by Mr. Middlemist, Master R.N.—*In Civil Time.*

Hour.	Courses.	Winds.	Remarks, &c., H. M. S. Blanche, August 15, 1830.	
A.M.	N N W	N Eastly	A.M. Fresh breezes and squally; tried for soundings half-hourly. 3.30. Down fore-topmast-staysail and set fore staysail; close-reefed mizen-topsail. 4. Ditto weather. 4.30. Close-reefed fore-topsail, and reefed foresail and set it. 5.30. Wore, close-reefed main-topsail; furled fore and mizen topsails; down top-gallant-yards and masts; in flying jib-boom; reefed and furled mainsail. 8. Strong gales, with violent squalls; ship pitching and working heavily. 9. A hurricane; getting in jib-boom, ship made a heavy plunge; lost the boom, spritsail yard, and jib, and three seamen, who were unfortunately drowned; cut away life-buoy, but to no effect; both bumkins went in about	See Chart II.
2	N N W ½ W			
3				
4				
5	N W by N			for ship
6	E ½ S	Northly		
7, 8	Head from E to S to SE by E			hove-to,
9, 10, 11	from E to N E	N Westly		and wind veering.

CHAP. II.

Extract from the Log of H.M.S. BLANCHE—*continued.*

Blanche's Log.	Hour.	Courses.	Winds.	Remarks, &c. H.M.S. Blanche, August 15, 1830.
Hurricane passing over ship.	A.M. 12	Head to N E	N West[ly]	the same time. 9·50. Both fore-topmast-stays went. 10. Fore-topmast carried away close to the cap, and fell with top-sail-yard on fore-yard, springing it in the starboard quarter; main-topmast stay carried away; got a hawser up and secured the masts; fore and main courser split and blew away; starboard cutter filled, cut her adrift, lost her gear; split fore-staysail; down ditto and trysail; violent hurricane and heavy sea; scuttled lower deck, and worked chain pumps. 11. Washed away starboard hl. nettings. 11.30. Wind shifted to N W, and blew more violently; bowsprit shroud carried away.

Course.	Latitude.	Longitude.	Bearings and Distance.	R. W.
N E	27° 15′ N	79° 35′ W	Matinilla Reef, N E ¼ E 30 miles.	78½

	P.M. 1	.....	S West[ly]	P. M. Ship laying over so much as to bury the starboard quarter-gallery, that in rising it was completely stove, as well as the dead-lights lost, with fore-topsail, top-gallant, and royal staysail.
	2	up W		2. More moderate; set main-staysail.
	3	off W N W		3. Split ditto; bent a new one.
	4			4. Ditto weather; set main-staysail; jolly-boat filled, carried away larboard tackle; cut her adrift, lost her gear.
More moderate.	5	from N E by N to N W		
	6			
	7	.....	W by N	6. Lashed the wreck of fore-topsail and topsail-yard to the ship; swifted main rigging; found bowsprit, mainmast, and fore-yard badly sprung.
	8	from W by N to N W by W		8. Strong gales and squally; tried repeatedly to put the ship before the wind.
	9			Midnight. Strong gales and squally weather.
	10			
	11			
	12			
				August 16, 1830.
	A.M. 1	W N W	S by E	A. M. Strong gales and squally.
	2	N by W		12.30. Set main-staysail.
	9	North		Strong breezes and squally, rolling heavily; employed clearing the wreck and securing the masts; found that the main rigging had, during the hurricane, drawn considerably through the seizings,
	10	N by E		8. Strong gales and squally weather; employed turning main rigging in afresh.
Storm moving northward and leaving ship.	12	North		Fresh gales and squally. Lat. 30° 12′ N, long. 79° 22′ W.

Extract from the Log of H.M.S. BLANCHE—*continued.*

Hour.	Courses.	Winds.	Remarks, &c. H. M. S. Blanche, August 16, 1830.	Blanche's Log.
P.M.			Bermuda, E pt. N 80 E, 772 miles.	
1	N ½ E	S W	P.M. Fresh breezes and squally weather.	
2			12.30. Sent the fore-yard down.	
4	E N E		3.30. Wore; unbent mainsail and main-topsail.	
			4.40. Set mizen-topsail.	
			6. Strong gales and squally weather; set main-trysail.	
			8. Strong gales, with a heavy sea.	
			12. Fresh breezes and squally, with rain.	
			August 17, 1830.	
A.M.				
1	E N E	S by W	A.M. Fresh breezes and squally, with rain.	
10	E by N		Fresh breezes with a heavy swell.	
11	N E		Observed a ship running before the wind; bent spritsail to main-topsail-yard as jury main-topsail; showed our colours.	
12	E by N		Altered course to speak New York Packet (of London) from Jamaica bound to London; set trysails, and resumed our course.	
			Noon. Fresh breezes and cloudy weather.	
			Lat. 31° 42′ N, long. 76° 59′ W.	
			Bermuda, N 87° E, 596 miles.	
P.M.				
1	E by N	S W	P.M. Fresh breezes and cloudy weather.	
4	E ½ N		2.30. Bent mainsail; reefed ditto.	
			4. Ditto weather; set mainsail.	
			4.30. Got main-top-gallant-mast up for fore-topmast; down main-trysail, and set spanker.	
			7. Set main-staysail; crossed main-top-gallant-yard.	
			9.40. Up spanker.	
			11.30. Up mainsail.	
			Fresh breezes and cloudy.	
			August 18, 1830.	
A.M.				
1	E ½ N	S W	A.M. Fresh breezes and rainy.	
4	.....	W N W	3. Up foreyard and jury-topsail, and in main-trysail.	Storm had now reached Boston.
5	.....	S W	4. *Light airs and cloudy*, with heavy rain, thunder, and lightning.	
			5.30. Trimmed; set courses; observed a ship and barque on weather-beam.	
			Squared yards; got stump of jib-boom in, and pointed flying jib-boom.	
			9.30. Up mainsail, and set main-trysail.	
			11.30. Set spanker.	
			Moderate, with rain.	
			Lat. (No observation.) Long. 74° 6′.	
			Bermuda, N 87° E, 477 miles.	

CHAP. II.

Blanche's Log.

Extract from the Log of H. M. S. BLANCHE—*continued.*

Hour.	Courses.	Winds.	Remarks, &c., H. M. S. Blanche, August 18, 1830.
P.M.			
1	E ½ N	W S W	P.M. *Light airs and cloudy.*
2	.....	West	3.30. Got flying jib-boom out, as a jib-boom crossed; main-royal-yards as a jury fore-gallant-yard.
4	.....	N by W	
6	.....	Calm	
9	N E		Set the sail.
10	E N E		Ditto weather.
11	N E	Calm	Up mainsail. 7.30. Trimmed.
12			12. Light airs and cloudy: trimmed; set mainsail.
			August 19, 1830.
A.M.			
1	S E	E N E	A.M. *Light airs and cloudy.* 12.10. Trimmed; wore ship.
2	S S E		
4	N E	Variable	4. Light airs and cloudy. 4.30. Trimmed, and set spanker.
6	N N E		7.40. Up mainsail and in jury-topsail.
7	N N E ½ E		8.50. Spoke ship Ruth (of London) from Jamaica.
8	N E by N		11.30. Up mainsail; unbent jury-topsail, &c.
10	N N E ½ E	East	12. Fresh breezes and cloudy weather.
11	N N E		Lat. (No observation.) Long. 73° 34′ W. Wreck Hill, N 88° 50′ E, 445 miles.
P.M.			
1	N N E	East	Moderate with rain; discovered a leak in after bread-room.
3	N N E ½ E		4. Moderate and cloudy; found main-topsail-yard sprung in larboard quarter.
5	North	Variable	
7	N by W		Moderate and cloudy.
8	S E by E		Ditto weather.
9	E S E		12. Moderate and cloudy.
10	E by S	N E	
11	E S E		
			August 20, 1830.
A.M.			
1	E S E	N E	A.M. Moderate and cloudy weather.
3	East / S E by E		4. Ditto weather. 4.30. Out fourth reef of main-topsail and second reef of mizen-topsail.
5	East		7.30. Unbent main-topsail to fish the yard.
7	E ½ E	Variable	Noon. Light breezes and fine weather. Lat. 32° 52′ N, long. 72° 43′ W.
10	.....	N by E	
P.M.			
1	E by S	N by E	P.M. Moderate and fine weather.
5	E ½ S	N N E	
10	E by S		Midnight. Ditto weather.

Blanche's Log.

Extract from the Log of H. M. S. BLANCHE—*concluded.*

Hour.	Courses.	Winds.	Remarks, &c., H. M. S. Blanche, August 21, 1830.
A.M. 1	E by S		A.M. Moderate and fine weather.
2	E ½ S		
8	E ¾ S	N N E	
9	E ½ S		
10	E by S ½ S		
12	S E by E ½ E		Noon. Moderate and fine weather. Lat. 32° 25′ N., long. 70° 39′ W.
P.M. 1	.....	N E	
2	E S E		
3	S E by E ½ E		
5	S E by E		
6	S E	E N E	
7	S E by E		
11	S E by E ½ E		Midnight. Fresh breezes and fine.

The remainder of the Blanche's log, as far as the time of her arrival at Halifax, will be found in Chapter V.

This ship had fine weather until the evening of the 22nd, when another storm overtook her. Her place on the 22nd will be found on Chart II. The dotted circle marked on that chart is intended to represent the storm's place on the 25th.

These two storms closely following each other, and causing changes of wind, will be further illustrated in Chapter V., which treats of the Variable Winds.

CHAPTER III.

THE BARBADOS HURRICANE OF 1831.

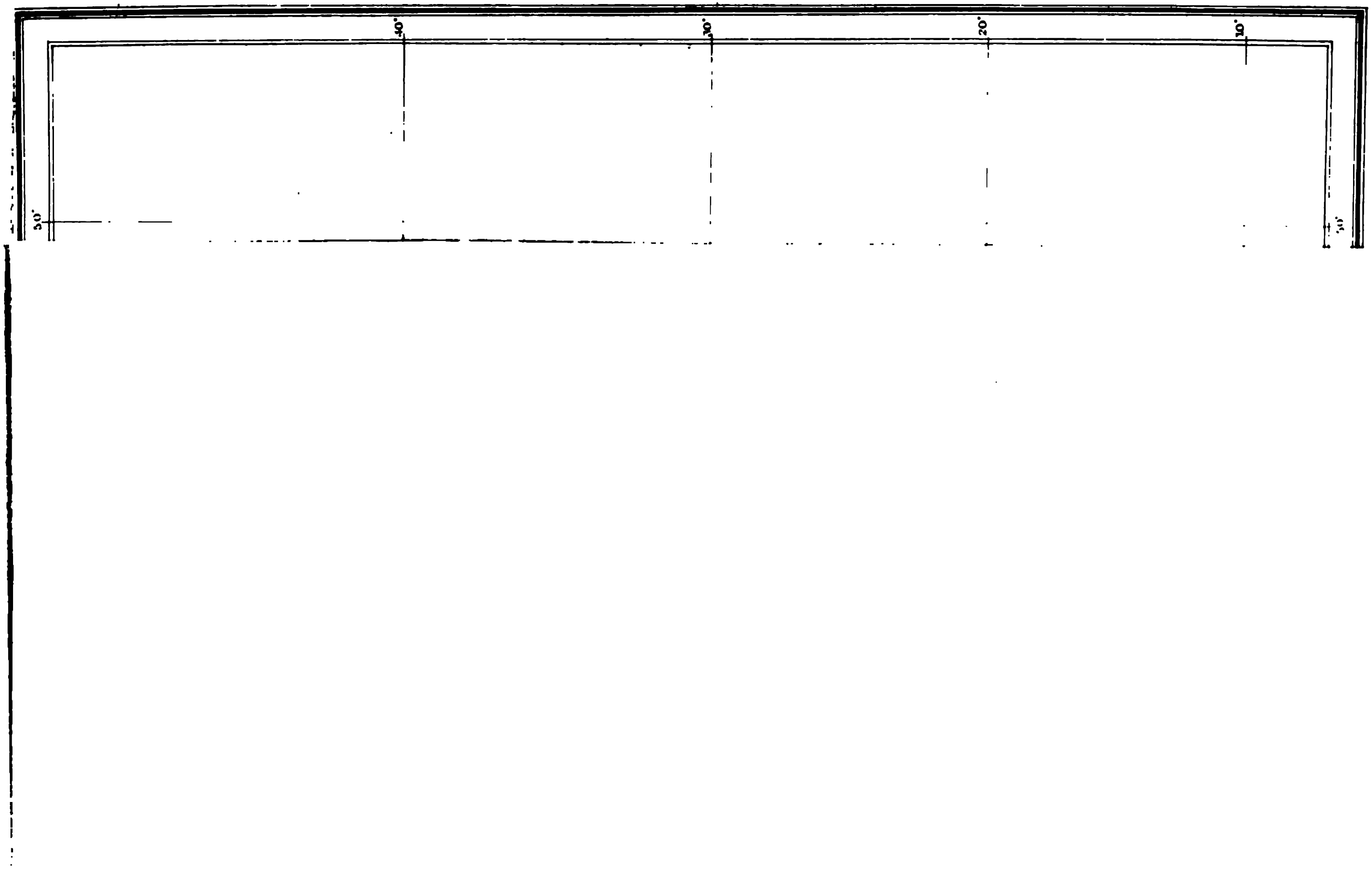
CHAP. III.

Progressive rate of hurricanes.

WHILST employed for two years and a half in the islands of Barbados and St. Vincent, amongst the ruins caused by the hurricane of 1831, I had the best opportunity of ascertaining that the progressive rate of the storms is not greater than that of the ordinary atmospheric currents; and that hurricanes certainly appear to owe their destructive power to their rotatory velocity.

The distance between Barbados and St. Vincent is nearly 80 miles. This storm began at Barbados a little before midnight on the 10th of August, 1831; but it did not reach St. Vincent until seven o'clock next morning: its rate of progress, therefore, was about 10 miles an hour.

A gentleman of the name of Simons, who had resided for forty years in St. Vincent, had ridden out at daylight, and was about a mile from his house, when he observed a cloud to the north of him, so threatening in appearance, that he had never seen any so alarming during his long residence in the tropics: he described it as appearing of an olive-green colour. In expectation of terrific weather, he hastened home to nail up his doors and windows; and to this precaution attributed the safety of his house, which is situated on the Upper Adelphi estate, on the east side of St. Vincent, and opposite the centre of the island. Mr. Simons described

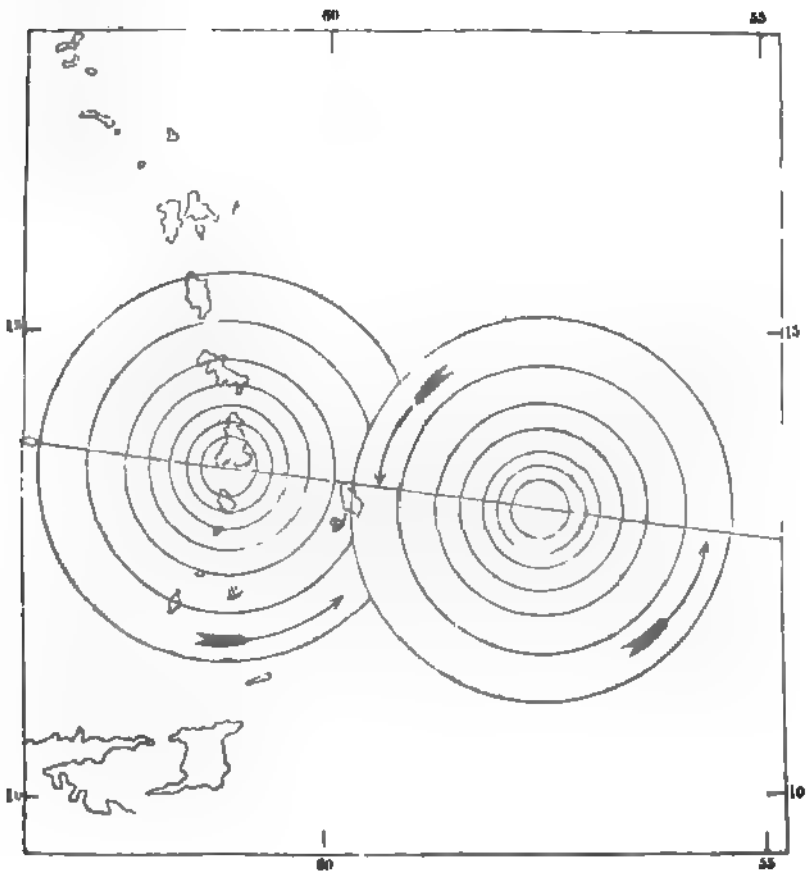

40'
30'
20'
10'
50'
10'

the effects of the storm to me, on the spot from whence he first saw the cloud, in the north.

The centre of this hurricane, coming from the eastward, seems to have passed a little to the north of Barbados and St. Vincent; and Mr. Redfield has traced its course to the southern United States of America, as may be seen on Chart III.

The annexed figure will assist in explaining this, and make the account of it, here reprinted, more intelligible.

The easternmost circles are intended to represent the whirlwind hurricane as it set in at Barbados, and



CHAP. III.

the westernmost circles are meant to represent the same whirlwind storm when its centre was over the southern part of the island of St. Lucia and the wind blowing from the south at Barbados.

The following account of the Barbados hurricane of 1831 is taken from that published at Bridgetown in that island immediately after it occurred.

Morning before the storm.

"On the 10th of August, 1831, the sun rose without a cloud, and shone resplendently. At 10 A.M. a gentle breeze which had been blowing died away. After a temporary calm, high winds sprung up from the east-north-east, which in their turn subsided. For the most part calms prevailed, interrupted by occasional sudden puffs from between the north and north-east.

Noon.

"At noon the heat increased to 87°, and at 2 P.M. to 88°, at which time the weather was uncommonly sultry and oppressive.

4 p.m.

"At 4 the thermometer sank again to 86°. At 5 the clouds seemed gathering densely from the north, the wind commencing to blow freshly from that point: then a shower of rain fell, followed by a sudden stillness; but there was a dismal blackness all round. Towards the zenith there was an obscure circle of imperfect light, subtending about 35 or 40 degrees.

6 p.m.

"From 6 to 7 the weather was fair, and wind moderate, with occasional slight puffs from the north; the lower and principal stratum of clouds passing fleetly towards the south, the higher strata a scud, rapidly flying to various points.

7 p.m.

"At 7 the sky was clear and the air calm: tranquillity reigned until a little after 9, when the wind again blew from the north.

9 p.m.

"At half-past 9 it freshened, and moderate showers of rain fell at intervals for the next hour.

10 p.m. wind NNE.

"Distant lightning was observed at half-past 10 in the north-north-east and north-west. Squalls of wind and rain from the north-north-east, with intermediate calms succeeding each other until midnight. The thermometer meantime varied with remarkable activity: during the calms it rose as high as 86°, and at other times it fluctuated from 83° to 85°. It is necessary to be thus explanatory, for the time the storm commenced and the manner of its approach varied considerably in different situations. Some houses were actually levelled to the earth, when the residents of others, scarcely a mile apart, were not sensible that the weather was unusually boisterous.

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"After midnight the continued flashing of the lightning was awfully grand, and a gale blew fiercely from the north and north-east; but at 1 A.M. on the 11th of August the tempestuous rage of the wind increased; the storm, which at one time blew from the north-east, suddenly shifted from that quarter, and burst from the north-west *and intermediate points*. The upper regions were from this time illuminated by incessant lightning; but the quivering sheet of blaze was surpassed in brilliancy by the darts of electric fire which were exploded in every direction. At a little after 2 the astounding roar of the hurricane, which rushed from the north-north-west and north-west, cannot be described by language.* About 3 the wind occasionally abated, but intervening gusts proceeded from the south-west, the west, and west-north-west, with accumulated fury.

Midnight. 1 a.m. Storm's centre. 2 a.m. wind NNW. 3 a.m.

"The lightning also having ceased, for a few moments only at a time, the blackness in which the town was enveloped was inexpressibly awful. Fiery meteors were presently seen falling from the heavens; one in particular, of a globular form and a deep red hue, was observed by the writer to descend perpendicularly from a vast height. It evidently fell by its specific gravity, and was not shot or propelled by any extraneous force. On approaching the earth with accelerated motion, it assumed a dazzling whiteness and an elongated form; and dashing to the ground in Beckwith-square, opposite to the stores of Messrs. H. D. Grierson and Co., it splashed around in the same manner as melted metal would have done, and was instantly extinct. In shape and size it appeared much like a common barrel-shade;† its brilliancy and the spattering of its particles on meeting the earth gave it the resemblance of a body of quicksilver of equal bulk. A few minutes after the appearance of this phenomenon, the deafening noise of the wind sank to a solemn murmur, or, more correctly expressed, a distant roar, and the lightning, which from midnight had flashed and darted forkedly with few and but momentary intermissions, now, for a space of nearly half a minute, played frightfully between the clouds and the earth with novel and surprising action. The vast body of vapour

Lightning.

* Lieutenant-Colonel Nickle, commanding the 36th regiment, who had sought protection by getting under an arch of a lower window, outside his house, did not hear the roof and upper story fall; and was only assured this had occurred by the dust caused by the falling ruins.

† A barrel-shade is the name for the glass cylinder put over candles in the tropics.

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appeared to touch the houses, and issued downward flaming blazes which were nimbly returned from the earth upward.

"The moment after this singular alternation of lightning, the hurricane again burst from the western points with violence prodigious beyond description, hurling before it thousands of missiles—the fragments of every unsheltered structure of human art. The strongest houses were caused to vibrate to their foundations, and the surface of the very earth trembled as the destroyer raged over it. No thunder was at any time distinctly heard. The horrible roar and yelling of the wind, the noise of the ocean—whose frightful waves threatened the town with the destruction of all that the other elements might spare—the clattering of tiles, the falling of roofs and walls, and the combination of a thousand other sounds, formed a hideous and appalling din. No adequate idea of the sensations which then distracted and confounded the faculties, can possibly be conveyed to those who were distant from the scene of terror.

"After 5 o'clock the storm, now and then for a few moments abating, made clearly audible the falling of tiles and building materials, *which by the last gust had probably been carried to a lofty height.*

6 a.m. wind South.

"At 6 A.M. the wind was at south, and at 7 south-east; at 8 east-south-east; and at 9 there was again clear weather. * * * *

"As soon as dawn rendered outward objects visible, the writer, anxious to ascertain the situation of the shipping, proceeded, but with difficulty, to the wharf. The rain at the time was driven with such force as to injure the skin, and was so thick as to prevent a view of any object much beyond the head of the pier. The prospect was majestic beyond description. The gigantic waves rolling onwards seemed as if they would defy all obstruction; yet as they broke over the careenage they seemed to be lost, the surface of it being entirely covered with floating wrecks of every description. It was an undulating body of lumber*—shingles, staves, barrels, trusses of hay, and every kind of merchandise of a buoyant nature. Two vessels only were afloat within the pier; but numbers could be seen which had been capsized, or thrown on their beam-ends in shallow water.

"On reaching the summit of the cathedral tower, to whichever

* *Lumber* is the American term for timber; and *shingles* are made of split blocks of wood, and are used instead of tiles and slates for roofs.

point of the compass the eye was directed, a grand but distressing picture of ruin presented itself. The whole face of the country was laid waste; no sign of vegetation was apparent, except here and there small patches of a sickly green. The surface of the ground appeared as if fire had run through the land, scorching and burning up the productions of the earth. The few remaining trees, stripped of their boughs and foliage, wore a cold and wintry aspect; and the numerous seats in the environs of Bridgetown, formerly concealed amid thick groves, were now exposed and in ruins.

"From the direction in which the cocoa-nut and other trees were prostrated next to the earth, the first that fell must have been blown down by a north-north-east wind; but far the greater number were rooted up by the blast from the north-west."

The centre of this storm appears to have passed a little to the north of Barbados, and over the southern extremity of St. Lucia; and its further progress may be seen on Chart III.

St. Lucia.

On the evening of the 10th no unusual appearance had been observed at St. Lucia; but as early as 4 or 5 o'clock next morning the garrison, stationed near the northern extremity of the island, began to be alarmed: some hut-barracks were blown down, and the wind was then nearly *north*.

4 a.m. Aug. 11th.

The storm was at its greatest height between 8 and 10 o'clock in the morning; but from that time the wind gradually veered round to the *east*, diminishing in force and dwindling as it were to nothing in the *south-east*, and it was succeeded by a beautiful evening, with scarcely a breath of wind.

10 a.m.

At the southern extremity of the island the most violent part of the storm is reported to have been from the *south-west*.

St. Vincent.

At St. Vincent the garrison was at Fort Charlotte, near the south-west point of the island; and there the

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Wind West.

wind first set in from *north-west*, veering to *west* and to *south-west*, raising the water of the sea in Kingston Bay so as to flood the streets; and it unroofed several of the buildings in the fort, and blew down others: but at Martinique (as will be seen from the following report printed in the "London Shipping List" for 1831), the wind was *easterly* during the gale.

Martinique. Wind East.

"PARIS, Sep. 15, 1831.—The Martial arrived at Havre from Martinique; sailed on the 15th of August. On the 11th of August a gale at *east* was experienced there which lasted six hours. The plantations suffered severely. Two vessels belonging to Bordeaux, and all the Americans at anchor in the road of St. Pierre, were driven out to sea."

Off Grenada. Wind Westerly.

The army schooner, the Duke of York, on her return from Trinidad to Barbados during this hurricane, was in sight of Grenada in the evening, and to the eastward of that island. About midnight she first began to experience hard squalls from the *north-west*, which caused the master to take in sail. The squalls increased until the vessel could carry no sail at all, and she was expected every moment to founder. Happily, at daylight, those on board of her unexpectedly found themselves drifted close to the island of Barbados, the cause of which will be evident on inspection of the figure given in page 25, where her place is marked.

Dominica.

The hurricane was felt at Dominica, but I have not learned in what direction the wind blew there.

Effect of electricity on forest trees.

A great part of the island of St. Vincent is covered with forest, and a large portion of the trees at its northern extremity were killed without being blown down. These I frequently examined in 1832; and they appeared to have been killed, not by the wind,

but by the extraordinary quantity of electric matter rendered active during the storm.

Most accounts of great hurricanes represent the quantity of electric matter exhibited to be very great; and the description given by Hughes of a great storm, which occurred at Barbados during the night of the 31st of August, 1675, is nearly the same as that of 1831. He states, that the lightning darted, not with its usual short-lived flashes, but in rapid flames, skimming over the surface of the earth, as well as mounting to the upper regions.

During the severest period of the hurricane at Barbados, on the night of the 10th of August, 1831, two negroes were greatly terrified by sparks passing off from one of them. This took place in the garden of Codrington College; and it was related to me on the spot where it happened, by the Rev. Mr. Pindar, the Principal of that College. Their hut in the garden had just been blown down, and in the dark they were supporting each other, and endeavouring to reach the main building.

No earthquake.

In the work I have quoted on this Barbados hurricane, allusions are made to the declarations of some persons, that they felt shocks of earthquakes during the storm. But after attentively listening to the opinions of different people on this point, and careful examination of the ruins with reference to it, I feel persuaded there are no sufficient reasons for believing that any earthquake occurred at this period: and it is very material to the success of the present investigation, that the phenomena of hurricanes and earthquakes should not be connected together without proof. The ancient Charibs, and after them many of

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the European settlers, seem to have thought no power but that of earthquakes sufficient to cause these tempests which suddenly disturb their regular climate.

The following paragraph occurs in the same work: Mr. Benjamin Gittens relates, that at his property, called Tubbs's, "About two P. M. of the 10th of August, he observed indications of approaching bad weather; and at four, intimated to his negroes that a hurricane might be expected. At six, he bid them not quit their homes, as a dreadful storm was approaching, and if they went abroad they would probably be seen no more. At nine, the indications which caused his apprehensions were less apparent, and he retired to rest. It is well known that this gentleman foretold the storm of 1819, some hours previous to any other person suspecting such an event. The indications observed by Mr. Gittens were—1st. The darting forward of the clouds in divided portions, and with fleet irregular motion, not as if borne by the wind, but driven as it were before it. 2ndly. The distant roar of the elements, as of wind rushing through a hollow vault. 3rdly. The motion of the branches of trees, not bent forward as by a stream of air, but constantly whirled about."

Indications of a hurricane.

Bermuda. The swell of the sea.

The undulations of the sea caused by this hurricane reached the Bermudas, where they broke against the south shore of those islands. Whilst the storm was passing over the West Indies on the 11th, 12th, and 13th, white objects appeared of a light blue, so decidedly as to attract the attention of all the inhabitants. It is thus recorded in the *Bermuda Gazette.*

White objects appeared light blue.

"*Appearance before a Hurricane. Barbados Hurricane,* 1831.

"It is worthy of remark, that on the 11th, 12th, and 13th of

August, 1831, the sun here bore a blue appearance, and where it shone in rooms, or elsewhere, it was also blue: this was about the time of the hurricane of Barbados."

The crews of vessels off Bermuda observed the same appearance, their sails appearing blue; and the same is said to have been observed by ships as far west as the coast of America.

Appearance off St. Kitts.

Dr. John Frith, of Bermuda, was at sea on the afternoon of the 11th of August, 1831, *becalmed* a few miles north of St. Kitts. He informed me that the appearance of the day was that of evening when the sun had set, and the full moon risen.

Barometer.

The only information relative to the fall of the barometer I have been able to obtain, is contained in the following extract from a note from Lieutenant Byrne, Fort Adjutant at Barbados, addressed to Archdeacon Eliot. Lieutenant Byrne says:—

"On reference to my notes, I find that at eight o'clock at night, on the 10th of August, the barometer stood at thirty inches, and at two o'clock in the morning of the 11th of August, it had sunk to 29.40; and my informant, on whose statement I can rely, states, that he is almost confident, by four o'clock, it must have sunk below twenty-eight inches."

CHAPTER IV.

BARBADOS HURRICANE, SEPTEMBER 3, 1835. — ANOTHER AT ANTIGUA IN AUGUST, 1835.—GROUND SWELLS EXPLAINED.

HURRICANES at Barbados have usually been experienced in their extremest violence, blowing from the north-west, west, and south-west; and the reason is, that their centres generally pass to the northward of the island. But the storm about to be traced here of September 3, 1835, came from the south-east, and passed on a course much further to the south than usual.

Weather previous to storm.

The account here given of it, has been chiefly obtained from the executive Engineer Officer at the time on the island, Captain George Tait, who was constructing a pier of timber in Carlisle Bay; and at six in the morning had set his parties to work, when the weather was more close than usual, and inclining to calm. About seven, he observed a ship of war coming from the eastward to stand into the bay; and soon afterwards crowding sail, and standing out again to sea. This vessel proved to be H. M. S. Champion, and the barometers on board indicated an approaching storm.

H. M. S. Champion.

Swell.

About nine A.M. a report was brought to Captain Tait, that the sea had risen in an extraordinary manner, and was threatening great damage to the pier. On returning to the beach, he found the waves rolling into the bay, of a very unusual height, and actually destroying the work; the wind still blowing but lightly from the usual direction of the trade-wind,

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about east-north-east: but before half an hour more, it had come on to blow so violently, that with difficulty could persons keep their feet.

Wind E.N.E.

The wind, at first east-north-east, *veered gradually* more and more *to the east*, and then having reached the east continued veering towards the *south*, until at the conclusion of the storm it blew into Carlisle Bay, just round the Cape, on which Fort Charles is situated, as marked on Chart IV.

veering to south.

H. M. S. Spitfire.

One dotted line on the chart shows the probable course of the centre of this storm; and another line parallel to it shows the portion of it which would pass over Carlisle Bay; and this last line will explain the mode of the veering of the wind. H. M. steam-vessel Spitfire (commanded by Lieutenant Kennedy) was lying in the bay; and her log, as well as that of the Champion, has been procured from the Admiralty; and both are here inserted. The fires of the Spitfire's boilers not being lighted, she did not go to sea until 11 A.M. By steering to the westward, both vessels remained for a longer period of time subject to the influence of the hurricane; and it will be found in pursuing the examination of various reports of ships, that vessels often sail with the storm, when they scud in a hurricane.

Ships sometimes sail with the storm.

During this storm several boats were driven to sea from their anchors at Speightstown on the north-west side of Barbados; and one large boat, which had broke from her moorings, was found at St. Lucia. Another boat having one man on board returned to Barbados, after being several days at sea.

This storm abated at Barbados about one o'clock in the afternoon, and by two was altogether over.

About half-past three in the afternoon it would appear that the ship Champion was in the centre of the tempest, and by her course she must have crossed from the right-hand side to the left, of the course of the hurricane. At midnight she still was in the gale; but by one in the morning of September 4th it was over at the place she then occupied.

The Spitfire steering west-south-west from Carlisle Bay, and going at the rate of five, six, and seven knots an hour, lost her mainmast at four in the afternoon, by which time she also was in the left-hand side of the hurricane's course; but by eight in the evening she appears to have got out of the storm.

This storm was felt only in a slight degree at St. Vincent.

The place of the Nightingale packet, arriving from England and approaching Barbados, will be found on the chart; and an extract from her log-book is likewise inserted.

Extract from the Log of H. M. S. CHAMPION, kept by W. Parker, Master.

H. M. S. Champion off Barbados. See Chart IV.

Hour.	Courses.	Winds.	Thursday, Sept. 3, 1835.	
A.M. 1	E ½ S	N N E	A.M. Fresh breezes and cloudy; braced up on starboard tack, head off shore; extremes of the island of Barbados, N W by W ½ W.	
2.30			2.30. Furled the mainsail.	
4			4. Squally, with rain.	
5.40			5.40. Bore up, set the foresail, jib, and driver.	
6.15			6.15. Squally, with thick heavy rain; up foresail and driver, down jib; wore ship's head off shore; lowered topsails, and close reefed them.	
7			7. Wore and set the courses. 7.45. Made our number to the signal station, Barbados.	Left Carlisle Bay.
8			8. Up courses and hove-to; found lying here H. M. steam-vessel Spitfire; the commander of ditto came on board; bore-up: out fourth and third reef; set the top-	

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Extract from the Log of H. M. S. CHAMPION—*continued.*

	Hour.	Courses.	Winds.	Thursday, Sept. 3, 1835.
	A.M.			gallant-sails. Needham's Point, E S E, half a mile; set courses.
Storm overtaking ship.	9	W by N		9. Squally; in top-gallant-sails, up mainsail, down top-gallant-yards, and struck the masts.
	10	W by N ½ N	N E	10.30. In three reefs of the topsail; furled the mizen ditto; reefed the foresail, and set it.
	Noon			Noon. Strong gales, with thick rain. Lat. d. r. 13° 15′ 24″ N, long. d. r. 60° 14′ 40″. Point Moliciqua, St. Lucia, N 66° W, 50 miles.
	P.M. 1	W by N ½ N	N E by N	P.M. Strong gales, with thick rain; close reefed the fore and main-topsails; bent the storm-staysails; sent top-gallant-masts and stud-sail booms on deck, and made all snug aloft.
	1.20			1.20. Heavy squalls; furled fore-topsail, up foresail, in main-topsail, and furled them.
	2			2. Set the main-trysail and fore and main-staysails. 2.20. Brailed up the trysail, down main-staysail; wore ship's head to the eastward; down fore-staysail.
Storm's centre.	2.30	.....	N N E	2.30. A tremendous heavy hurricane; brought to the wind under bare poles. 3.40. The wind moderated and shifted suddenly round, with heavy rain, to the opposite, and blew most violently; a sea over the stern.
	3.40	.....	S S W	
	5.40			5.40. Washed the dingy and life buoy from the stern.
	6	.....	S S W	6. The wind moderated; set the main-staysail and main-trysail.
	6.30			6.30. Strong gales; down main-staysail.
	7 & 8	S W off W S W		8. Strong gales and squally, with rain; set the fore-staysail.
	11	S W by S		
	Midn.			Midnight. Strong gales and squally, with rain; wore ship.
				Friday, Sept. 4, 1835.
	A.M. 1	Head from N to N E	E S E	A.M. Moderate and cloudy. 4. Wore ship; down main-staysail.
	5	.....	Easterly	Day-light. Saw the high land of St. Lucia, N W by W, 15 or 16 miles; moderate and cloudy; made sail to single-reefed top-sail and fore-sail.
	7	W by N		
	8			8. Point Moliciqua, N E, 4 miles; moderate, with rain.
	9	W by N ½ N		
	10			10. Sent the top-gallant-mast up, and fidded ditto; crossed top-gallant-yards, and set top-gallant-sails; sent the stud-sail-boom and small sails up, and loosed them to dry; carpenter employed repairing hammock-nettings, and other defects.
	11	.....	E S E	11. Out first reefs of the topsail.

Extract from the Log of H. M. S. CHAMPION—*concluded.*

Hour.	Courses.	Winds.	Friday, Sept. 4, 1835.
A.M. Noon	W N W		Noon. Moderate and cloudy; Sugar-loaf Hill, St. Lucia, E, 13 miles. Observations, 13° 48′ 8″ N Altofela, N by W, 125 miles.
P.M. 1	W NW	S E by E	P.M. Moderate and fair.
8	.....	E N E	Ditto weather.
11	.....	E by S	Ditto.

Extract from the Log of H. M. Steam-Vessel SPITFIRE, Barbados, Lieut. A. Kennedy, Commanding; kept by Samuel Lillinop, Second Master.

Hour.	Courses.	Winds.	Thursday, Sept. 3, 1835.	
A.M. 1	....	N E	A.M. Fresh breezes and cloudy, threatening weather, with rain at times. At 8, arrived H.M.S. Champion; commander went on board per signal. 8.45. Sailed H.M.S. Champion. 9.50. Lit the fires; every appearance of a hurricane. At 10, a hard gale, heavy sea making in the bay; several sail slipt their cables; several boats that were lying at the engineer's wharf were sunk at their moorings; sent a boat to their assistance, but found it impossible from the wind and sea to make head-way. 10.30. The anchor came home, the wind blowing a heavy gale. At 11, finding it impossible to ride the hurricane, slipt the cable with a long buoy-rope, 60 fathoms of chain, wind blowing a hurricane from N E. At 11.15, the dingy was blown from the stern; the gig swamped and lost; the cutter was blown in-board, and stove in several places; the masts, sails, and oars of the boats were lost.	Spitfire in Carlisle Bay. Lighted fires and put to sea. See Chart IV.
8				
8.45				
9.50				
10				
10.30				
11				
11.15				
Noon	.....	Veered to southward and westward	Noon. Blowing a hurricane; wind veered round to the southward and westward, sea making a complete breach over the ship; hove 73 bags of coals overboard to lighten ship. No observation.	Crossed storm-track.
P.M. 1	W S W		P.M. Still blowing a hurricane; main-trysail, fore-staysail, and jib blown from the bolt-rope; ship labouring very much; fore-trysail was blown from the gaskets, and a great part of it lost; main-trysail-gaff carried away.	
2	.....	Variable		
3				
4			At 4, the mainmast went, about three feet below the deck, and fell across the	Mainmast went.
5				

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Extract from the Log of H. M. Steam-Vessel SPITFIRE—*concluded.*

Hour.	Courses.	Winds.	Thursday, Sept. 3, 1835.
A.M.			
6			larboard quarter, breaking the rail, two stancheons, and splitting the covering-board; six hammocks were washed out of the netting, and larboard binnacle quarter-deck, and fore-hammock-cloths.
7			
8			
9	S W ½ S		
10			
11			8. More moderate.
12	S W		12. Fresh breezes, and cloudy weather.

Extract from the Log of H. M. Brig NIGHTINGALE.

See Chart IV.

Hour.	Courses.	Winds.	Wednesday, Sept. 2, 1835.
A.M.			
1	.....	E N E	Fresh breezes and cloudy.
Noon	.....	E N E	Lat. 14° 34′, long. 55° 40′. Barbados, S 73, W 251.
P.M.			
1	.....	E N E	Fresh breezes and squally.
4.30	.....	E N E	Heavy squalls, with rain; in all studding-sails; close-reefed the topsails.
8	.....	E	Squally, with rain.
			Thursday, Sept. 3, 1835.
A.M.			
1	.....	E	Squally, unsettled weather.
8			Squally, with rain; furled all sails; down the top-gallant-yards and mast, and got flying jib-boom on deck.
10	.....	S E	Bent the storm-sails, and set them.
12	.....	S	Sun obscured.
			Lat. d. r. 13° 10′, long. 57° 54′. Barbados, south point, S 85, W 102.
P.M.			
1	.....	S S E	Strong gales and squally.
2			Set the topsails and course.
4			Strong breezes and dark cloudy weather.
8			Moderate breezes and cloudy.
9	.....	S E	Saw the island of Barbados, bearing W, distant three or four leagues, south point bearing W S W. Midn. North extremity of the island W 13 N.

Nightingale within the circuit of storm.

The wind is stated as blowing from the south-east and east-south-east, until the evening of the 4th, when it became east-north-east, and the Nightingale anchored in Carlisle Bay, at 7.15, P.M.; and was soon afterwards despatched after the Spitfire, supposed to have been in sight, dismasted.

"LIVERPOOL, Oct. 22, 1835.—The island of Barbados was visited with a severe hurricane on the 3rd of September. The sloop Goldhunter, of St. Vincent, was lost; crew saved. The mail-boat, Lady Lyon, was capsized and sunk; one man saved. The mail-boats, Nancy and Mary and Placid, were stranded. The Manchester and Montague lost foremasts; and the Firefly, Ariel, and Barbados, were driven out to sea, and they had not returned on the 14th of September.

"H. M. steamer Spitfire, the Hebe, of London, and several other vessels put to sea; the Spitfire was driven into Grenada with damage and loss of mainmast; and the Hebe returned on the 9th under jury-masts, having been dismasted. The gale extended to St. Lucia; and the north end of that island was strewed with lumber and pieces of wrecked vessels. The Thomas Parker was driven there from Barbados, dismasted. H. M. S. Nightingale arrived at Barbados on the 4th of September."—*From the London Shipping List of* 1835.

Ground swells.

A ship at anchor, in such a storm as the one here detailed, where the wind blows into the bay in which she is riding, affords the best opportunity for ascertaining the height of the waves in hurricanes, when vessels are observed by persons on shore. The mainmast of the Spitfire has been ascertained to measure ninety-two feet in length: and some observations were taken with a view to this inquiry into the height of the waves before she slipped her cable to go to sea, but as they were not committed to writing at the time, they cannot be relied upon.

Height of waves.

In ordinary gales of wind on the south coast of England, I found, in 1836, the height of the waves measure twelve feet, by a graduated pile on the outer end of the Brighton chain-pier, and they proceeded forward at the rate of twelve miles an hour. In 1837, during gales rather more severe, the waves were observed at the same place, by Captain Alderson, Royal Engineers; they were then found to be thirteen

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and a half feet high, and proceeding at the rate of nineteen miles an hour; but the height of the barometer was not noted at the time. In the deep sea of the Atlantic, Captain Fitz Roy measured the height of the waves by ascending the rigging of a frigate, and found them to be sixty feet high, computed from the trough.

Inundations.

The diminished atmospheric pressure probably allows the undulations of the sea to rise higher in storms, as is the case with the tides: and this may be another cause, as well as the wind, why great disasters often occur from inundations during storms.

Progress of undulations.

If undulations were to proceed forward no faster than nineteen miles an hour during hurricanes, still the waves would considerably precede the storm. This chapter, together with Chart IV., tends to explain what is called a ground swell; and the reasons for the uncertainty of seaman, whether a ground swell does or does not bespeak a coming storm: for a ship on the shaded portion of the plan would have the swell, and yet not experience the storm.

It was long supposed that the undulations in water were merely on the surface, and that the motion of the particles of water was vertical. Recent researches prove that this opinion is not correct, and seem clearly to show that the effect of heavy waves is propagated downwards. The great waves which are raised by hurricanes, affect the sea by degrees to an unknown depth; but rolling onwards until they reach soundings and shallower water, they are there found to act powerfully against the bottom. These are strictly "Ground Swells;" of which further illustration will be given in the progress of this work.

A short time before this there had been a hurricane

at Antigua and St. Kitts. At Antigua it happened on the 12th of August, 1835; the wind during the first part blowing from the north, and during the latter part from the south, with a calm of twenty minutes in the middle of it. From this account, the centre probably passed over Antigua.

Antigua hurricane of 1835. Calm.

The barometer was observed to fall 1.4 inch; and the sympiesometer was much agitated, and fell proportionably.

Trees were blown down, as if forming lanes, an effect which has been remarked in many other descriptions of hurricanes; and at its commencement the wind was described as coming in gusts.*

Gusts.

The course of the storm, which passed over Antigua on the 12th of August, has been traced by Mr. Redfield, and will be found on Chart III.

It has been said that hurricanes are not met with to the eastward of the West India islands; but this is not correct. A ship met the Barbados hurricane of 1831 to the eastward of that island. Two of the hurricanes of 1837 I have traced to the eastward of the West Indies; and there seems no reason to believe that they are caused by the islands, as some persons imagine.

Storms do originate eastward of the West India islands.

Whatever their cause may be, that cause seems to act with very different degrees of intensity at different periods; for the usual atmospheric current, or trade-wind, is sometimes disturbed, the veering and changes indicating a rotatory movement of part of the atmosphere, without proving destructive. Such an instance occurred on the 9th and 10th of July, 1837; and

Rotatory winds not always storms.

* From a verbal statement of Major Barry, R.E., who was at that time at Antigua.

CHAP. IV.

this is also another instance in proof that storms come from the eastward of the West India islands.

Clouds in this gale mistaken for land.

The gale about to be mentioned was met to the eastward of Barbados, both by the ships Trinidad and Castries; but I have not been able to trace the first ship. Mr. Mondel, as well as all his crew and passengers, appears to have taken one of the squalls for *land;* and it seems to have passed very nearly over the same track as that on Chart IV., the centre passing over St. Lucia. At St. Vincent the wind became *west.*

Extract of a letter from Liverpool.

"On the 9th July, the Castries (Mondel), from Liverpool to St. Lucia, in lat. 15° 4′, long. 54° 58′, having the wind then at east-south-east, the master being confident in his reckoning, his mate suddenly reported, 'Land on the lee-bow!' the man at the helm pointing it out at the same time: it had all the appearance of the broken outline of the West India islands, and looked as if within a mile and a half from them. Never doubting but that it was land, the captain trimmed his sails, that he might alter his course: when he had finished, he again looked for the land, when nothing like it was visible. On Reaching St. Lucia, and hearing that there had been a hurricane there on the 10th, he concluded that what he had seen was this storm. The Castries had no barometer on board."

The following is Mr. Mondel's account:

Ship Castries.

"Noon, 9th July, *nautical time* (8th *civil time*), wind east-north-east. At 3^h 52^m 2^s, long. per sun and moon 51° 33′ west; 4^h 8^m 9^s, long. per chronometer, 51° 59′ west; cloudy weather. At midnight strong breezes, and much lightning; 2 A.M. heavy squalls and rain. At noon, lat. by account 15° 3′, by observation 15° 4′; long. by chronometer 54° 58′, by observation 54° 18′; north point of St. Lucia, south 81° 12′ west; 353 miles.

"At 8^h 16^m 45^s, long. per moon and * Antares 54° 41¼′. Noon, 10th July, *nautical time* (9th *civil time*), commences cloudy weather. At 3.30. P.M. was alarmed by the officer on deck

calling out 'Land a-head!' I ran up from below, and there, to my astonishment, saw what appeared to be the land, about two miles distant, the vessel sailing seven to eight miles per hour. We took in all staysails and stood to the south (wind east-south-east), which might have occupied six or eight minutes to accomplish, in which all appearance of land had subsided. So strongly the appearance of land did this phenomenon assume, that even the Irish passengers saw it, or believed they saw it; and I have a perfect recollection of one of them calling down the hatchway to his comrades, 'Arrah, by Jasus, boys, here's the land close-to.' Every seaman on board saw it, and would have sworn it was the land, had they not been convinced to the contrary by the course steered. I had some difficulty to convince two gentlemen that were passengers that it was not the land, nor were they altogether assured until we saw Barbados. At noon, lat. by log 14° 28′, by observation 14° 57′; long. by chronometer 57° 42′, by observation 57° 14′; current 29 miles north; north point of St. Lucia, south 75° 32′ west; 188 miles.

"1, King Street. (Signed) "J. MONDEL, JUN."

Ship Trinidad.

"The barque Trinidad, from the Clyde, experienced a severe gale of wind, approaching to a hurricane, on Sunday last, the 9th July, to the eastward of Barbados."—*From the Port of Spain Gazette, July* 10, 1837.

Extract from a letter in Lloyd's Books, dated Barbados.

Barbados. Wind N. E. and S. E.

"The whole of the 9th July the wind blew strong from north-east, with occasional heavy gusts, until 7 P.M., when it came in a severe gale. At 10 P.M. the wind moderated for a short time, when it began again, with increased violence, from *south-east* and *south-south-east*, until daylight next morning, when the gale abated. The schooners Myrtle and St. Andrews were driven on shore on the Pelican reef, to the leeward of Carlisle Bay."

"The gale on the 9th July did some injury to the mills and houses in Barbados."—*From the West Indian, July* 10.

CHAP. IV.

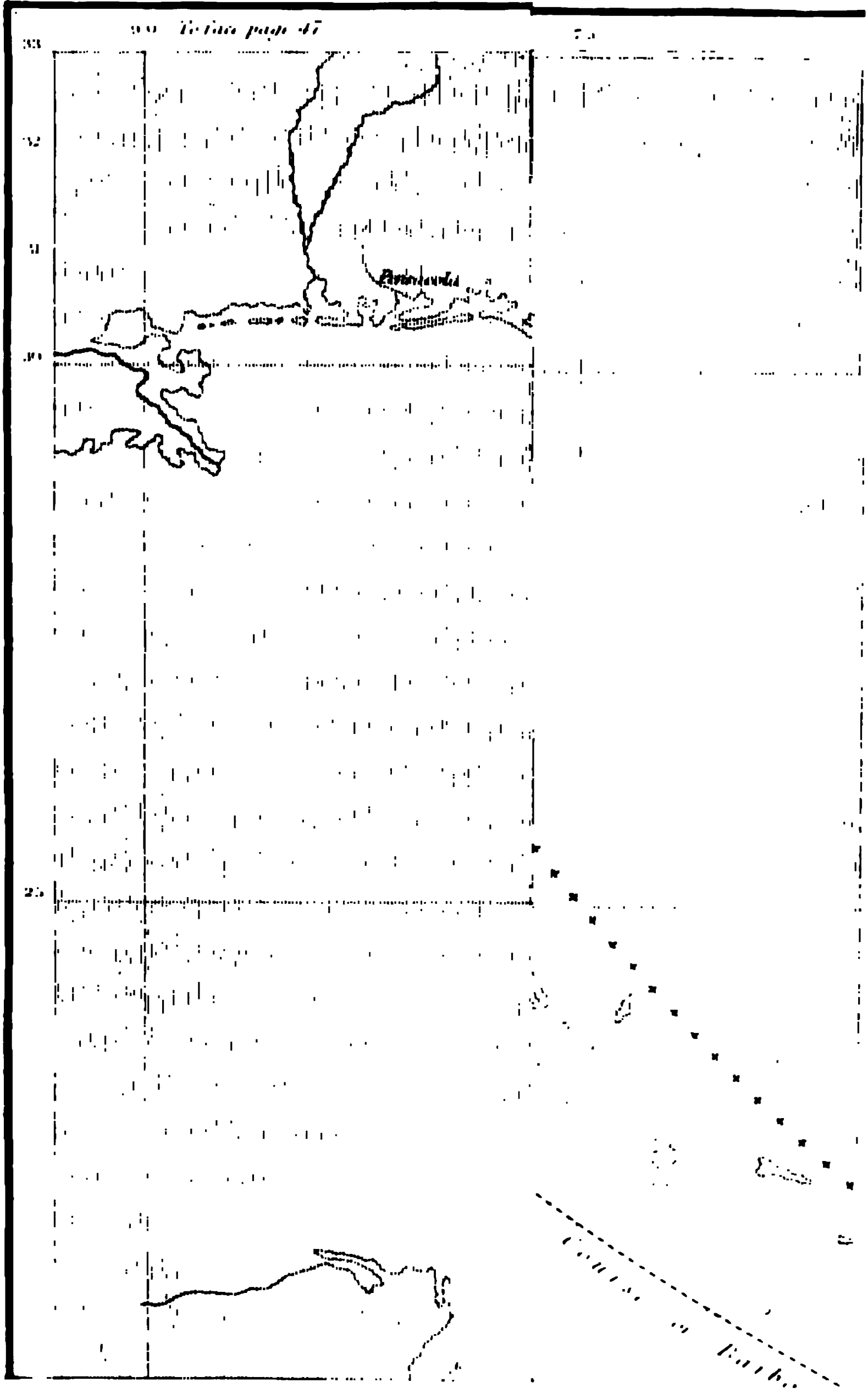
St. Lucia. Wind N. and S.

"ST. LUCIA, July 19th.—The island received a severe gale from the *north* and from the *south*, on the evening of Sunday, 9th July, and the morning of Monday, 10th July, 1837, during which the schooner Mary Ellice (M'Lean), then lying in the bay of Vieux Fort, was driven on the rocks, and the drogher Eliza driven on shore."—*From Lloyd's Books.*

(Signed) "WM. MASTERS."

St. Vincent. Wind west.

"ST. VINCENT, July 10th.—The weather has been boisterous during the night, and the wind was at *west*."—*Ibid.*



CHAPTER V.

ON THE HURRICANES OF 1837; AND ON THE VARIABLE WINDS.

THE foregoing accounts may not of themselves furnish conclusive proof that great storms are rotatory; yet they sufficiently show that the inquiry opens to us a new field for meteorological investigation.

On Charts V., VI., and VII. four storms are traced, and connected with a fifth, which followed each other with only the interval of a few days. The investigation into these is connected with a fifth storm, not drawn on the charts. An attentive examination of the details of these strengthens the probability that all such storms are rotatory, if it does not actually confirm it; and, by tracing and connecting so many in close succession, the subject opens in yet another form, altogether new and of fresh interest, for it leads us to an explanation of the VARIABLE WINDS.

But it is necessary to examine each storm with attention and to follow the details, in order to ascertain whether or not they were really rotatory; and at the end of this chapter we shall be prepared to enter again on the consideration of the last half of the voyage of the Blanche frigate to Halifax in 1830, which affords a good example of the way in which a succession of progressive revolving gales causes changes of wind.

The Spey packet brought to England the account of two severe hurricanes in the West Indies in 1837.

CHAP. V.

These have been traced, and are laid down on Charts V. and VI. The earlier of the two passed over Barbados on the morning of the 26th of July; at ten the same night it was at Martinique, by which hour it was all over at Barbados; at midnight on the 26th and morning of the 27th it reached Santa Cruz. By the 30th of July it reached the Gulf of Florida, where some vessels were wrecked by it, and many damaged; it then took a more northerly direction, being on the 1st of August at Jacksonville, in Florida.

From Jacksonville it passed over Savannah and Charleston, going in a direction to the eastward of north.

The other hurricane on Chart VI. was at Antigua on the 2nd of August; by the 5th and 6th it also was on the coasts of Georgia and Florida, crossed the line of the other hurricane, nearly meeting it; and it seems to have touched Pensacola on the 8th of August.

Barbados hurricane of 1837.

The reports of these two storms are arranged in the order of their progress, and are as follow:

Ringdove's Log. See Chart V.

Extract from the Log-Book of H. M. Brig RINGDOVE, in the Barbados Hurricane of the 26th July, 1837. Received from Lieut. J. W. Tarleton, R.N.

	H.	K.	F.	Courses.	Winds.	Remarks on Board.
	A.M.					July 25th, 1837.
Fine weather.	1				Easterly.	At anchor in Carlisle Bay, Barbados.
	2					A.M. Light breezes and fine.
	3					8. Loosed sails.
						Noon. Moderate and fine.
	P.M.					P.M. In cutter.
Weighed.	4					4. Weighed and made sail out of the Bay.

Log of the RINGDOVE—*continued.*

H.	K.	F.	Courses.	Winds.	Remarks on Board.	First storm.
P.M. 5					5. In first reefs, unbent cables.	Ring-dove's Log.
6						
7	7	2	N N W	N E	7. North point of Barbados, E by N, 7 or 8 miles.	
8	6	6	N by W ½ W		8. Moderate, and cloudy.	
9	7	6	N by W		10.45. Hard squalls, with heavy rain; in top-gallant sails, mainsail, and jib; first reef of boom-mainsail, and second reefs of topsails.	Squalls.
10	7	6	N by W ½ W	Variable		
11	7	6	N N W	from N E	Midnight. Fresh breezes, with passing squalls; set jib and mainsail.	
12	5	6	N W by N			
					July 26th, 1837.	
1	6	6	N W ¾ N		A.M. Fresh breezes and squally, with rain.	
A.M. 2	6	2	N W ½ N	N N E	1. 50. Up mainsail; tacked.	
3	4	6	E N E		2. 40 Heavy squalls, with rain.	Heavy squalls
4	3	4	N E by E ½ E		4.10. Down jib, set stay-sail.	
5	4	4	E N E	Variable	5.30. Up foresail, and lowered the topsails to a squall; in third reefs of topsails, down top-gallant-yards and masts; in flying jib-boom; down boom-mainsail; braced round *on the starboard tack.*	
6	4	4				
7	3	4	E ½ N			on starboard tack.
8	1	4	N N E	S by E	8. Variable breezes and cloudy weather. A heavy cross swell.	
9	3	4			9. Trimmed sails to a breeze from the southward.	
10	9	4	North		9.20. Dark threatening weather, wind increasing. 10. Fresh gales, with hard squalls and a heavy sea; close-reefed and furled the topsails; in jib-boom, got preventer-braces on the yards and runners to secure the foremast.	Close-reefed topsails.
11	6	6			11. Gale moderating.	
12	6	2			Noon. Fresh gales, with passing squalls.	

Courses.	Dist.	Lat. Obs.	Lat. D.R.	Lon. Chro.	Long. D.R.	Bearings and Distance.
N 19°W	63	None	14° 21′ N	None.	60° 4′ W	Cape Ferre, Martinique, N 75° W, 44 miles.

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Log of the RINGDOVE—*concluded.*

	H.	K.	F.	Courses.	Winds.	Remarks on Board.
First storm.						
Ring-dove's Log.	P.M.					P.M. Fresh breezes and squally; a heavy swell.
	1	5	6	N by E	S by E	1. More moderate; set fore-staysail and close-reefed fore-topsail.
	2	6	4	N N E		
	3	7	4			1.40. Set close-reefed main-topsail.
	4	7	4			2.50. Out fourth reefs, set foresail and lee clew of mainsail.
	5	6	6			
	6	7	6		E S E	4. Moderate and cloudy, a heavy swell.
	7	7	4			
Out third reefs.	8	6	6			4.20. Out third reefs, down fore and set fore-top-mast-staysail.
	9	6	6			
	10	7	4			5.40. Trimmed sails.
						6. Fresh breezes and cloudy.
					Easterly	8. Ditto weather.
	11	7	4			11. Trimmed sails.
	12	7	4			12. Fresh breezes and fine.
	A.M.					July 27th, 1837.
	1	6	6	N N E	East	A.M. Moderate breezes and fine.
	2	6	4			
	3	6	2			2. Trimmed.
	4	5	4	N by E ½ E		4. Fresh breezes and cloudy.
	5	6	4			
	6	6	4			7. Altered course to N by E; out jib-boom.
	7	6	4			
	8	5	6	N by E		8. Fresh breezes and fine.
	9	5	4	North		Altered course to N.
	10	4	6			8 40. Set jib.
Out second reefs.	11	4	6			10.50. Out second reefs of topsails.
	12	5	6			Noon. Moderate and fine.

Courses.	Dist.	Lat. Obs.	Lon. Chro.	Lat. D.R.	Long. D.R.	Bearings and Distance.
N 176°	155	17°21′ N.	° ′ 58 56 W.	16 °49′ N.	59° 7′ W	Bermuda, N 19° W, 949 miles.
1	4	6	North		East	P.M. Moderate and fine.
2	4	2	N by W		E S E	1. 30. Up top-gallant-masts, crossed top-gallant-yards, and set the sails.
3	4	4				
4	4	6				
5	5	6			S E	Out first reefs, and set starboard fore-topmast and top-gallant studding-sails.
6	5	6				
7	4	4				
8	5	4				4. Moderate and cloudy.
9	4	4				6. Ditto weather.
10	4	6			E N E	8. Ditto breezes and fine; trimmed.
11	5	4				
12	5	2				Moderate and cloudy.

At 10 A.M. on 26th, the sympiesometer fell from 30.10 to 29.74. At 11, sympiesometer rising. Noon, sympiesometer 29.92. No barometer on board. CHAP. V. First storm.

Extract from Lieut. James's Private Journal, commanding the SPEY Packet. See account of Antigua hurricane, 2nd August, 1837:

"BARBADOS, July 26, A.M.—At 2 o'clock, light showers of rain, wind shifting from south to north-west, the sky dark and gloomy, with flashes of lightning in the south-east and south-west: at 4, calm, with a heavy swell rolling into the bay; lightning and thunder, sky assuming a blue-black appearance, with a red glare at the verge of the horizon; every flash of lightning was accompanied with an unusual whizzing noise, like that of a red-hot iron plunged in water: at 6 the barometer fell rapidly, the sympiesometer much agitated and unsettled, and fell at length to 28.45 inches; hoisted in the boats, sent down top-gallant-masts, struck lower yards and topmasts, let go both bower anchors, veered out a long scope of cable on the moorings and both bowers: at 7.30, the hurricane burst on us in all its dreadful fury: at 8, it shifted *from east-south-east to south*, and blew for half an hour, so that we could scarcely stand on the deck; made preparations for battening the hatches down and cutting away the masts; the sea came rolling into the bay like heavy breakers, the ship pitching deep, bowsprit and forecastle sometimes under water: the wind shifting to the *west-south-west*, at 9 the barometer began to rise, and to our great joy we observed a change in the sky for the better. As the haze cleared away, we counted twenty-one sail of merchantmen driven on shore, and perfect wrecks. Her Majesty's ship Gannet drove with four anchors down, but fortunately brought up and rode out the gale. Her Majesty's steamer Alban went on shore, but in all probability will be got off. One brig foundered at her anchors, and sunk. Thank God, we rode it out so well! The Spey, the Gannet, and Fortitude merchant ship, were all that rode out the hurricane. The City of Kingston steamer put to sea, and returned next day.

Chart V. Its commencement.

Wind E. S. E.

veering to S. and to W. S. W.

"On the 30th of July, the Spey left Barbados to run along

CHAP. V.

First storm.

the islands and pick up the mails for England. Found that the hurricane had scarcely been felt at St. Lucia, but at Martinique several ships were wrecked."—*Times Newspaper.*

"The barque Clydesdale, from Barbados to Antigua, encountered a severe hurricane ten miles north of Barbados, on the 26th of July, 1837."

Grenada.

"Arrived the British schooner Emancipation, from Grenada, The captain states, that Grenada and the neighbouring islands had been visited by a violent gale on the 26th July, 1837."—*New York General Advertiser.*

St. Vincent.

"Our paper from St. Vincent's informs us, that the gale of the 26th of July was severely felt there; the wind being from the *west* and the *south,* with a heavy swell of the sea."—*From the Barbadian.*

St. Lucia.

"ST. LUCIA, 30th July, 1837.—We have experienced a severe gale from the *north-west,* which blew very violently for several hours."—*From Lloyd's Books.*

Martinique.

"Martinique suffered a severe gale on the 26th July, from the *south-east.* The brig Blayais went on shore, with forty-three persons on board, and only six were saved."—*From the Weekly Register.*

"The storm of the 26th July was felt severely at Martinique The tempest raged there with great violence at 10 at night, at which hour all was calm at Barbados. The Blayais was driven on shore at St. Pierre, a harbour much exposed to the south-west. An American vessel was driven on shore at Fort Royal, which is an unusual occurrence, as that harbour has always been considered a safe anchorage in any weather."—*From the Barbadian.*

Dominica.

"One of the most violent gales of wind, which at this season are so alarming to these colonies, occurred on Wednesday last, 26th July, 1837. The wind blew *from south-east all day,* and about 8 in the evening, a *violent swell* set in from the south-west, which occasioned a tremendous surf. The barque Jane Lockhart was obliged to slip her cables, and stand to sea. The Venus sloop was washed up into Kew-street. The sloop

Dolphin, from St. Bartholomew's to Barbados, was forced back to this island, after having got within twelve miles of Barbados." —*Dominica Colonist.* CHAP. V.

Copy of a MS. report at Lloyd's, dated St. Croix. St. Croix.

"About midnight on Wednesday, the 26th of July, it came on to blow smartly *from the east-south-east*, shifting by Thursday morning, the 27th July, to *south-east*, blowing a gale of wind until towards noon, when it began to moderate.

(Signed) "ANDREW LANG."

"Le Navire Bonne Aimée a péri à Porto Rico dans un coup de vent, 26, 27 Juillet, 1837."—*Port of Spain Gazette.* Porto Rico.

"A Spanish brig was totally dismasted on the 28th of July, off St. Domingo, in a hurricane, and had to throw overboard a quantity of flour."—*American Paper.* St. Domingo.

"ST. DOMINGO, Aug. 13.—*Two hurricanes* have been recently experienced here, during which the Edward (French ship) was wrecked in the outer roads, and three of the crew drowned: three Haytian vessels were also lost on the coast, and only one man saved."

"The gale on the 29th July, at Nassau, was *from the east and the east-south-east*, as reported by the master of the sloop Humming-Bird."—*Newfoundland Gazette.* Nassau.

"There was a violent gale at Nassau, New Providence, from the *east and south-east*, on the 29th July, which continued until 2 P.M. on Monday, the 31st of July."—*New York General Advertiser.*

The following was received from Captain Milne, R.N. By referring to Chart V. and the place of the Snake, off the N.E. end of Cuba, it will be understood how this storm caused the trade wind to be reversed. We have here an example of variable winds within the limits of the trades, changing in conformity to a fixed law. Captain A. Milne, R.N.

"H.M.S. Snake, under my command, was employed during the months of June, July, and August, 1837, on the N.E. coast

CHAP. V.

of Cuba, in the vicinity of Point Mulas, during which time the following *facts* connected with the hurricanes of that year were observed.

First storm.

"It was found from observation, that at 8 A.M., the mean height of the barometer on the Coast of Cuba was 30.19 at a temperature of 83°, and the diurnal fall until 4 o'clock, at which time it was lowest, was 0.45 nearly. That the barometer was invariably affected by the direction of the wind; being highest with a N.E. wind, and lowest with a S.W.

Bar. 30.19.

"On the morning of the 25th July the barometer indicated 30.19, with the trade wind varying as usual from E.N.E. to E.S.E., force 3 to 4, with fine weather. On the following morning, July 26th, the barometer stood at 30 16, wind N.E. by E., the sky overcast, with thin rain.

Bar. falling.

"July 27th. Barometer drooping, now 30.10, wind very light and unusual, varying from N.N.W. to N.N.E. Dense cumuli in the N.W., streaked with strata of a dark colour; blue of the sky very light colour.

Sky light blue.

"July 28th. Barometer 30.08. Wind Northerly and E.N.E., very variable, sky overcast. Forenoon, breeze sprung up from the S.E. 9 P.M. heavy squall from N.E., with a heavy swell setting in from the same quarter.

"July 29th. Barometer 29.94. Fresh breezes and squally; wind E.N.E. to S.E. 10 A.M. a heavy long swell setting in from the N.E. increasing rapidly. Wind flying about, shifted to N. and N.W. 3.30. Barometer 29.86, and drooping. 4 P.M. heavy squall of wind and rain, in which wind shifted to W.S.W and S.W. Blew a strong gale all night; the barometer rose *after the squall.*

Bar. 29.86.

Centre passing Snake.

"July 30th. Barometer risen to 30.06. Sky still wild, although gale of last evening has subsided. Wind still S. to S. by E. with squalls of wind and rain.

Bar. 30.17.

"July 31st. Wind S. by E. Barometer 30.17; fine weather.

"It is a curious fact, relative to the gradual fall of the barometer from the 26th, the very day on which the hurricane was at Barbados, until the bad weather reached H.M.S. Snake on 29th, at 4 P.M., when it immediately rose. The shifting of the wind it will be observed was from S.E. to E.N.E.; then to N., N.W., W.S.W., S.S.W., S., and S. by E., when it cleared up. Vessels boarded at the time had experienced, on the 29th, a heavy north-easterly gale outside of Crooked Island.

(Signed) "A MILNE,
"Captain H.M.S. Snake."

Extract of a letter from Lieut. Parsons, commanding H. M. packet Seagull, dated Falmouth Harbour, 18th Sept. 1837; addressed to Admiral Sir P. H. Durham.

First storm. Chart V.

"We arrived here on the 18th from Mexico and Havannah; we had the wind for twenty days from the east and east-north-east, with four days calm. In coming through the Gulf of Florida, and in the narrow part of the channel, on the night of the 30th July, I experienced a very heavy gale of wind from the *north-west*, which increased on the morning of the 31st, with thick weather, lightning, and rain in torrents. At about 10 A.M. we discovered discoloured water on the lee-beam, having had no observation on the 30th. At this time the wind was *west*, which made the Bahama bank (where I judged we were) a lee-shore; and in carrying a press of sail to clear it, all of them were split and blown out of the bolt-ropes: I was therefore under necessity of anchoring in five fathoms water; and by the time I had veered out 100 fathoms of chain, the vessel's stern was in 4½ fathoms. I did not let go the other anchor, fearing she might founder, as the sea was making a fair breach, and rolling aft to the wheel on the quarter-deck; and if we parted, we had still a chance of getting into the Old Bahama Channel. With great difficulty we tried to get another jib and trysail bent.

H. M. packet Seagull.

On lee-shore, split sails and anchored.

"On the morning of the 1st August the wind increased, and blew a perfect hurricane for about four hours, when it moderated a little, and veered to the *south-west*, which enabled us to bend another topsail. At noon we began to weigh, and in three hours we were able to make sail off the reef.

"The part of the bank on which I suppose we anchored is lat. 24° 40′ north, long. 79° 8′ west, and twelve miles south of Orange Keys.

(Signed) "J. PARSONS."

Bahamas.

"The barque Baltimore, from Havannah, experienced heavy gales from the *westward*, on the 31st July, which continued until the 1st of August. She was over the reef on the Bahama banks by the Cat Keys, and compelled to anchor and ride out the gale. When the weather cleared on the 2nd, she saw three vessels on the reef wrecked, but she was unable to lend them assistance."—*New York General Advertiser.*

CHAP. V.

First storm. Florida coast.

"The barque Cossack, on the 1st August, encountered a violent gale forty miles south of St. Augustine. Met a ship, supposed to be the Emily, of Liverpool, dismasted, and making for a port."—*New York General Advertiser.*

"The ship Providence, on the 1st August, in lat. 29° 30′, experienced a heavy gale."—*Ibid.*

Extract of a letter from St. Simond's Island, lat. 31° 2′, long. 81° 28′:

"On the 1st and 2nd August we had a very severe gale here."—*Ibid.*

"The brig Monument (Fisher) experienced a severe gale on the 1st of August, off Cape Florida."—*Ibid.*

"The barque Josephine, on the 1st August, experienced a severe gale from *north-east*, lat. 27° 50′, long. 79° 20′, and had some of her sails blowing from the yards, though they were furled."—*Charleston Mercury.*

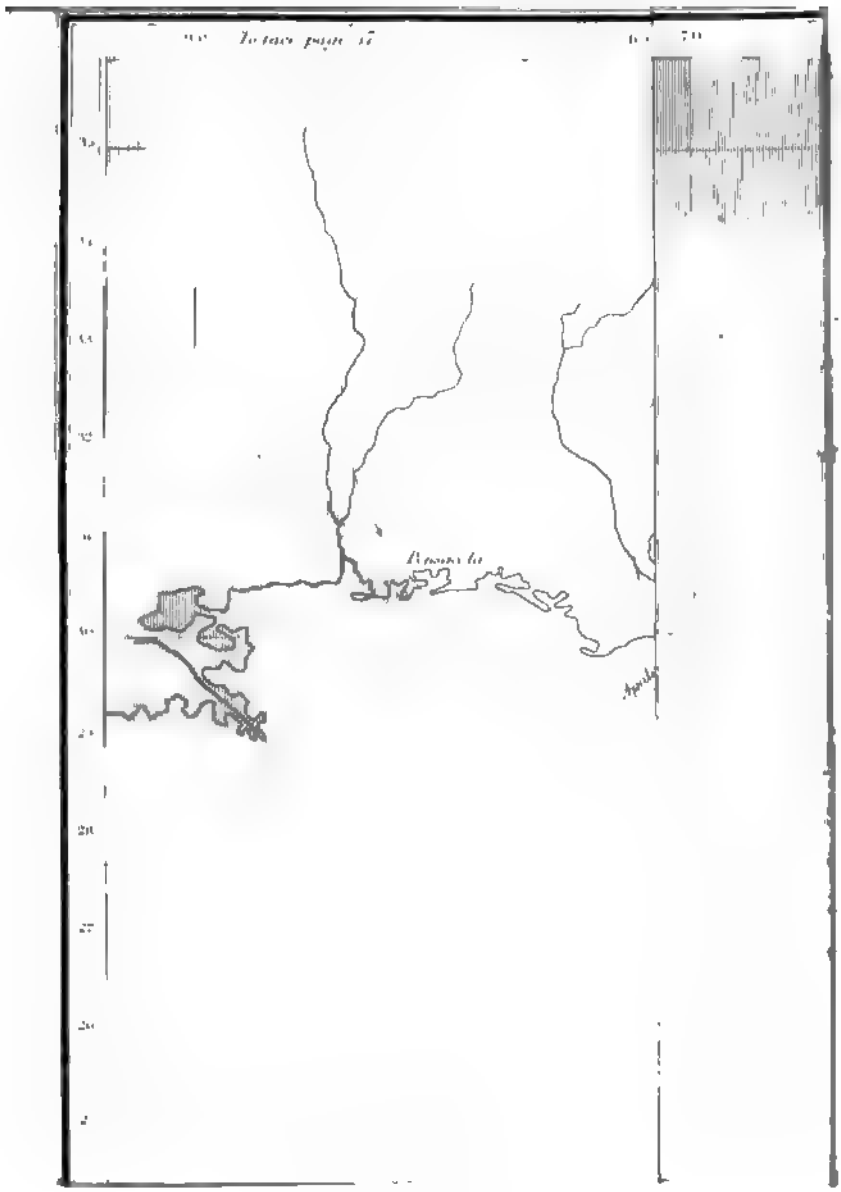
"The brig Moses, on the 1st August, off Cape Carnaveral, lat. 28° 16′, long. 80° 24′, experienced a severe hurricane, commencing at *north-east* and veering round to *south*, which hove the brig on her beam-ends, and obliged her to cut away her mast. She was in fourteen feet water, and was saved by the wind coming from the *south*."—*Ibid.*

"The schooner A. Brook, on the 2nd August, lat. 29° 38′, long. 80° 41′, experienced a severe gale of wind *from east-north-east* to *south-south-east*. Lost her flying jib and split her mainsail."—*New York General Advertiser.*

"A severe gale of wind at Jacksonville, on Tuesday, 1st of August, which continued until Sunday, the 6th of August,* when it blew a hurricane from the *north-east* and *south-east*. Two government warehouses were blown down at Jacksonville, and the crops of cotton destroyed."—*National Intelligencer.*

"The barque Mablehead, of Boston, was lost on the western reef of the little Bahama bank on the 2nd August."—*From the Southern Patriot.*

* This was owing to the second hurricane nearly overtaking the first one.



"The brig Howell anchored on the little Bahama bank on the 2nd August, 1837. Obliged to cut away both masts to prevent her going on shore in a violent gale."—*From the Southern Patriot.*

First storm.

"The Ida * experienced a severe gale in the Gulf on the 3rd August. All her sails were blown to pieces. The boats and twenty of the crew were washed overboard. The captain has brought her into port with five men."—*New York General Advertiser.*

"On the 26th July, the sympiesometer indicated the approaching storm more decidedly than the barometer."—*West Indian Newspaper.*

"The Georgia steam-packet left Charleston on Saturday, August 5th 1837, in the morning, and arrived at Norfolk in the Chesapeake, on Monday the 7th August. Had rough weather and *north-east winds.*"—*From the New York General Advertiser.*

The Balclutha. July 26th. See Chart V.

About 1 P.M. the southern portion of this storm was about W. S.W. of the Balclutha.

"GREENOCK, Dec. 5, 1837.—Thursday, 27th (26 P.M. *civil time*) July, in lat. 14° 28′ north, and long. 56° 12′ west, wind veered from east-north-east to west-south-west, with a tremendous swell from the southward; the sky clouded, with thunder and lightning, and heavy rain, with all the appearance of hurricane of wind; furled all sails but the main-topsail; at 1 P.M. a heavy gust took the ship, and laid the sail under water, which continued for the space of half an hour; at 3 P.M. the wind veered to the northward, and cleared up to the southward, but a very bad appearance to the south-west; had no barometer or sympiesometer; at 6 o'clock, fine clear weather; made all sail for Demerara, where the Balclutha arrived on the 3rd August.

"WILLIAM MILRAE."

* There were five ships named Ida. This is not the same ship which was in the third hurricane on the 17th August, 1837.

CHAP. V.

Antigua Hurricane of 2nd of August.

THE SECOND STORM.

Second storm.

The Spey packet, which had been at anchor in Carlisle Bay, Barbados, during the hurricane of the 26th July, sailed from that island on the 30th for St. Thomas, delivered mails at the northern islands as she went along, and, as will be seen by her log, was very nearly sailing into the second hurricane.

Spey's Log.

Extract from the Log of H. M. Packet SPEY, *in Civil Time*, Lieut. James, Commander.

Chart VI.

Hour.	Wind.	Bar.	Ther.	Remarks.
				Tuesday, August 1, 1837.
A.M.	.....	falling		A.M. Moderate and cloudy, with light showers and hazy weather; barometer falling: landed the mails at Dominica. The Jane Lockhart, of London, slipped and went to sea on the 26th, and returned to take in the rest of her cargo.
P.M.	S W			P.M. Calm and sultry, the sky overcast with dark heavy clouds, exactly the same appearance they had before the hurricane came on at Barbados; employed in preparing for another blow; got all snug, and kept away to the S W; further off the land the better.
				Wednesday, August 2, 1837.
A.M.	S E to W			A.M. Heavy squalls, with lightning and thunder; heavy sea running; wind shifted from S E to W.
P.M.		rising		P.M. Barometer rising; made more sail, and stood in for Guadaloupe; at 3, saw the land, ran in for Basse-terre, and landed the mails in a heavy surf; [illegible] away for Antigua.
				Thursday, [illegible]
A.M.				At 5 A.M. close [illegible] observed the island had an [illegible] nut trees, were [illegible]
P.M.				
A.M.				

Spey approaching second storm.

Near it.

Storm now past Spey.

See Chart V.

Extract from the Log of H. M. Packet SPEY—

Hour.	Wind.	Bar.	Ther.	Remarks.
				Saturday, A
A.M.				A.M. L
				Kitts; here the hurricane was
				ticle. The ship Julia, of L
				was wrecked on the 2d
				atoms, that there is hardly a
				be seen. The ship Michael, at
				shore, bilged, part of cargo
				charging into the Robert, of
				mail-boat Eleanor, with the
				on board, knocked to
				Sunday, A
A.M.				A.M. Arrived at
				ricane has destroyed
				plantations. One
				a great number of
P.M.				P.M. 2.30 Came
				Thomas's harbour,
				Here the hurricane of
				have concentrated
				fury, for the
				that baffles
				and vessels
				harbour,
				sunk or
				ra-
				ta out by
				wards of
				was very
				of the
				English
				pproach-
				that
				n 3 and 4
				e increasing
				rly. At 7 P.M.
				storm increased
				ricane from west-
				gusts until 10 P.M.,
				had taken place, which
				rning, the 3rd of August,
				h.

"ANDREW LANG."

Tortola.

mmenced at 3 P.M., and increased
began to abate."
hn's, N.B., was driven on shore
August."—*Tortola, August 6.*

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art VI.

CHAP. V.

Second storm.

"JAMAICA, Aug. 13.—The Judith and Esther arrived here from Cork; experienced a tremendous gale on the 1st inst. off Deseada, lat. 16°, long. 61°, *for 24 hours*, during which she was three times on her beam-ends, and lost boats, part of her bulwark, and sails."

Antigua.

"On the 2nd of August, between 2 and 3 A.M. we had a smart gale from *north, which crept gradually round by north-west, west,* and *south-west,* until it died away at *south-east.*"—*Antigua Herald of the 5th of August,* 1837.

"The barometer at Antigua, in the gale of the 2nd August, only sunk .43, another sunk .63."—*West Indian.*

Barbuba.

"The brig Maria Jane upset and dismasted off Barbuda, in the storm of August 2, 1837."—*American Paper.*

Nevis.

"This morning, between 3 and 4, the wind being north, a shower of rain fell. At half-past 6 A.M. the wind began to rise until 8, it then shifted to the *north-north-west,* and gradually increased *in gusts* until 10, during which time much rain fell. The wind then veered to the *westward,* and next to due *south,* then back to *south-west,** and last backed to *south* again, from whence it blew steadily and with violence until 2 P.M. when it abated."—*Nevis Post Newspaper, August* 2, 1837.

St. Kitts.

"Early on Wednesday morning, the 2nd of August, the wind blew strong from the *north,* and indicated the forthcoming storm. At about 8 A.M. it veered to *north-west,* and shortly afterwards to *west,* during which time it blew a perfect gale, throwing a tremendous sea into the harbour, and threatening the destruction of every vessel."—*St. Christopher Gazette.*

"The mail-boat Eleonore, Captain Carter, wrecked to the eastward of the bay of Basseterre, St. Kitts, on the 2nd August, 1837."—*Kingston Chronicle, Jamaica.*

* "It is difficult to ascertain with certainty the direction of the wind while the storm continued."—*From the St. Thomas's Times Newspaper, August* 5.

"At St. Bartholomew the storm commenced at *north-east*, and continued to increase with violence until 2 P.M."—*Barbadian Newspaper.*

CHAP. V.

Second storm. St. Barts.

Extract of a letter from the Dutch island of St. Martin:

St. Martin.

"A gale commenced about 9 A.M. and raged with great violence from 11 A.M. to P.M., veering from *east-north east* to *north-west.*"—*Barbadian Newspaper.*

Extract of a letter from Lloyd's Correspondent, dated Santa Cruz:

Santa Cruz.

"On Monday, 31st July, 1837, the weather was moderate; several ships sailed on Tuesday, the 1st of August; in the evening the wind was north-east and the weather moderate. On Wednesday, the 2nd, the wind during the night had shifted to *the north;* the weather looked squally, cloudy, and suspicious, and continued so during the forenoon; the wind shifted gradually to the *north-north-west.*

Chart VI.

"At 1 P.M. the falling of the barometer, the appearance of the weather, and the increasing wind, left us no doubt of the approaching storm, and it came on from the *north-west*, between 3 and 4 P.M. The mercury continued falling, and the gale increasing until half-past 6 P.M. when the wind became *westerly.* At 7 P.M. the mercury began slowly to ascend, but yet the storm increased in violence. At 8 P.M. it was blowing a hurricane from *west-south-west* to the *south-west*, coming in furious gusts until 10 P.M., when a certain decrease in their violence had taken place, which abatement continued until Thursday morning, the 3rd of August, when it blew a fresh gale from the *south.*

(Signed) "ANDREW LANG."

Tortola.

"At Tortola the hurricane commenced at 3 P.M., and increased in violence until 9 P.M., when it began to abate."

"The brig Jane, of St. John's, N.B., was driven on shore during the gale on the 2nd of August."—*Tortola, August* 6.

CHAP. V.

Part of the track of brig Water-Witch. Chart VI.

Extract from the Log-book of the Brig WATER-WITCH, W. Newby, Commander, from Liverpool to St. Thomas's (kept by the Mate), made by Mr. Gilbert Ker, Consignee of the Vessel.—In *Nautical Time*.

H.	K	H K	Course.	Wind.	Remarks on board, Tuesday, Aug. 1, 1837.
P.M.					
2		..	West	E by N	P.M. Fresh breezes and clear; people employed bending cables and shifting fore-topmast, and top-gallant studding-sails over.
4					
6					
8	5	..	W ½ N	Variable	At 5.30 made the island of Deseada, bearing S W by S, distant about 6 leagues.
10	5				
12	6	..	Midnight		At dusk, the land bore S S W; midnight, squally with heavy rain; in royals and all studding-sails.
A.M.					
2	5	1	.....	E N E	A.M. Steady breezes and cloudy; set do. sail; at daylight made the island of Montserrat right a-head; set the jib and trysail.
4	6				
6					
8	..	..	W N W	N E	Noon clear; rock Redonda bearing E S E and Charleston (Nevis) N. Lat. obs. 18° 3′ N.
10	.		.....	N	
12					
					Remarks on board, Wednesday, Aug. 2, 1837.
P.M.					
2	..	..	N W by W	N E	P.M. Fresh breezes and clear; people employed variously; made the island of St. Kitts; in lower and all lee studding-sails.
4					
6					
8		.	N W ½ W		At 2, made the island of Saba.
10					At dusk, in all studding-sails; Saba bearing N N E; and Eustatia E N E; at 8, in flying jib and royals; midnight, fresh breezes and cloudy; in top-gallant-sails.
12					
A.M.					
2					A.M. Do. weather.
4					At 7, made the island of St John, and shortly after that of St. Thomas.
6					
8					Noon squally; double reefed the top-sails, and stowed the jib; the town in sight.
10					
12					

By civil time P.M. 1st Aug. Brig in front of storm.

Extract of a letter from Captain Newby, of the British brig Water-Witch, from Liverpool to St. Thomas's, and which left Liverpool, July 17, 1837.

Storm overtaking the brig.

"Arrived off St. Thomas's on the 2nd of August; morning squally, and the Water-Witch was off St. John's, and standing for St. Thomas's, the wind *north* and *north-north-west*. Noon, shipping in the harbour visible; at 1 P.M. squalls violent; at 3 P.M. we had beat up within half a mile of the forts, when we could proceed no further for the violence of the squalls, and anchored in ten fathoms water; sent down top-gallant-yards,

Second storm at St. Thomas.

&c.; did not suspect a hurricane. At 5 P.M. squalls ceased, and began a heavy gale of wind, at that time off the land. At 7 P.M. a hurricane beyond all description dreadful; the windlass capsized, and I could not slip my cables, ship driving until I was in twenty fathoms water; a calm then succeeded for about ten minutes, and then, in the most tremendous unearthly screech I ever heard, it recommenced from the *south* and *south-west*; I now considered it all over with us, for the wind was directly on shore, and the sea rose and ran mountains high. The foretop-gallant-mast (though struck) and the gig were carried up some feet in the air, and the vessel drove again into twelve fathoms. We were obliged to steer her all night, and keep her head to wind, for when she got her bows to it she went down on her broadside. At 2 P.M. the gale abated somewhat, and the barometer rose an inch; at daylight, out of forty vessels, the Water-Witch and one other were the only two not sunk, ashore, or capsized."

Porto Rico.

"Papers from Caraccas have been received to the 5th of September. They contain a detailed account of the hurricane at Puerto Rico, on the 2nd of August, which was equally disastrous in its effects with that at Barbados and the other West India islands. Fourteen Spanish vessels, nine foreign, of which, however, not one was English, and ten coasters, were entirely wrecked during the tempest."—*Hampshire Telegraph.*

Extract of a letter from the Harbour-Master at Porto Rico to the Governor.

"At 4 P.M. on the 2nd of August, 1837, in consequence of having observed the barometer falling, I ordered all vessels in the harbour to prepare for stormy weather, although the fall of the barometer was not great.

Barometer.

"At 8 P.M. the mercury was at 29.6
"At 9 P.M. . . . . 29.5 Wind at N. N. E.
"At 10 P.M. barometer . . . 29.4 and strong.
"At 11 P.M. . . . . 29.3 Wind veering to E.
At this hour it began to blow in an alarming and furious degree until midnight; when the barometer stood at 28.0, and every vessel sunk or ashore.
"At ½ p. 1 A.M. 3rd August, the barometer rose to . 29.17
"At 4 A.M. the barom. stood at 29.5 Wind fell and then veered to S.

CHAP. V.

Second storm.

"Thirty-three vessels were at anchor, and all lost. From St. Bartholomew we have learned, that on the 2nd of August two hundred and fifty buildings were destroyed."

"The Nile, American brig, foundered at sea August 4th, 1837; lat. 31° 30′, longitude not known."

"The William IV. was lost at the island of Ramos, near the island of Taxando, Porto Rico."

"It blew a hurricane off Ragged Island on the 4th of August, 1837."

St. Domingo.

"A severe hurricane was experienced at Porto Plata (St. Domingo) on the 3rd of August, which did considerable damage."—*New York Paper.*

It is the salt water, driven by the force of the wind in hurricanes, over islands, which blackens vegetation in the manner described below. This evil is mitigated when abundant rain falls at the same time, by washing the salt spray from plants. Gales, unaccompanied by heavy rains, prove sometimes very destructive to small islands. The following I received from Captain Milne, R.N.

Captain A. Milne, R.N.

"H. M. S. Snake, off N.E. point of Cuba.

"*August 2nd.* Bar. 30.25, wind east, force 3, fine weather.

"*August 3rd.* Bar. 30.18, wind *not* as usual, being from S.E. to E., and P.M. to E.N.E., then to N.N.E., fine weather.

Chart VI.

"*August 4th.* Bar. 30.04, morning dull and hazy, sky wild and unsettled, wind N. by E., a *heavy swell* from N.N.E., breaking heavy on the coast. Bar. 29.98, wind shifted to N.W., fresh breezes and squally; 3 P.M. wind W.; 6 P.M. sky threatening and wild, a great deal of *dull blue* lightning pouring down in the *northern* sky; 8 P.M. strong gales with heavy squalls, wind S.W. by W., with thunder, lightning, and heavy rain; 10 P.M. wind subsided, barometer *risen*; midnight, light winds and cloudy, wind S. S.W.

"Following day fine weather, with wind S.W., S., and S.E.; Bar. noon, 30.13.

Second storm.

"On the 6th, arrived at Fortune Island; found that Crooked Island had been visited by a hurricane. The statement given by the residents was, that on Thursday night, the 3rd August, at 11 P.M., the gale freshened up at N.E., blowing with great violence, uprooting trees, blowing down their flag-staffs, and destroying vegetation. On the 4th, about noon, the wind shifted to N.W., blowing with greater violence than before; several vessels which were there were wrecked or left dry upon the beach: *total destruction to all vegetation.* Torrents of rain fell during the whole time, inundating the low lands: this rain was *brackish.* On the afternoon of the 4th, the wind shifted from N.W. to S.W,. still blowing hard; during the night it shifted to N.E., and cleared up. Another hurricane was expected next *full moon,* from there being *little* thunder and lightning during the hurricane. *From the fall of the barometer, on the* 15*th and* 16*th August, a gale must have blown in the vicinity of the Bahamas.**

"Having visited Crooked Island in the middle of July, I was much struck on my return after the hurricane, at the change produced on the face of the country. Where a few days previous nature presented all the brilliancy of tropical vegetation—oranges and limes hanging to their trees in graceful festoons—all now were gone; the trees lay prostrate, and the whole aspect of the island was changed from the vivid green of vegetation to the dark withered leaf, as if winter had encroached on the tropical regions. The changes of the wind were, as before, round by the north.

(Signed) "A. MILNE, Capt. H.M.S. Snake."

Nassau.

"NASSAU, NEW PROVIDENCE, 6th Sept., 1837.—Since the storms which occurred here on the 29th of July and 5th of August, 1837, we have had no accounts from the out islands until within the last three or four days. These accounts are very distressing. It was the gale which began amongst them on August 4th which did the greatest damage. The sea rose on the south side of the Great Bahama, and washed away some low land. At St. Salvador the storm was very severe, and several houses were blown down, as well as stock destroyed. At Long Island (more particularly on the north part of it) an unusual and destructive rise of the sea took place, and drowned a number of cattle. At Rum Key the loss was great indeed."—*From the Charleston Courier.*

Chart VI.

* This alludes to the storm on Chart VII.

CHAP. V.

"The Ulrica was dismasted off Hole-in-the-Wall on the 5th August, 1837."—*Charleston Mercury.*

Second storm.

"The brig Ann and Minerva, from Havannah to Corunna, on the 6th August, 1837, in lat. 30° 31′, long. 73° 19′,* during a severe gale *from the south-east*, was hove on her beam-ends and compelled to cut away both masts."—*From the Southern Patriot.*

"The brig Bell, from Demerara to Nassau, in gales from the 4th to the 6th August. She experienced a succession of hurricanes from the *north-west* and *south-west*. On the 7th, in lat. 27° 40, long. 75° 50′, spoke the Saratoga, and got a supply of bread and spars. On the 15th of August, in lat. 31° 21′, long. 78° 57′, met the Brilliant, Jamaica ship, bound for Liverpool, which supplied her with water and spars."

Extract of a letter from Mr. Gleig, Commander of the ship Athol, Havannah to Antwerp:

"Cowes, 15th Sept., 1837.

Ship Athol. Chart VI.

"I sailed from Havannah on August 1st, with a favourable wind from the *south-east*, until the morning of the 5th, when we were forced to shorten sail, with the wind from *north-east*. Towards evening we were compelled to heave-to, with a heavy sea going from the same direction, until the morning of the 6th, when about 9 o'clock the sea was perceived to be in a tremendous uproar, which was occasioned by the swell from the other direction.† At 10 o'clock it fell away calm all at once, and in the course of 20 minutes the water was perceived through the haze to appear the same as heavy breakers: when about 10 hours 30 minutes, our breakers turned into a complete hurricane, which assumed its greatest strength in the course of an hour, and lasted until betwixt 4 and 5 in the afternoon, when it abated gradually. The direction of wind was in general from *north* to *west*, but at times it extended as far as *south*.

Storm's vortex.

(Signed) "GEORGE GLEIG, Master."

"To Lieut.-Col. Reid, R. E."

* This lat. and long. places the ship beyond the verge of the storm, as I have marked it. The storm may have been more extended.

† See "The Progress of the Development of the Law of Storms and of the Variable Winds" for an explanation of winds and waves at the storm's vortex.

"The brig William, from Portland to Matanzas, put into Charleston on the 5th of August, 1837. Off Abaco experienced a severe gale from the *north-east:* lay to; hove overboard all that was upon her decks. Finding she was driving towards the shore, cut away both lower masts and let go her anchors, with the full scope of cable. At 9 P.M. the wind shifted to the *south-west,* when she parted the starboard chain cables; then the crew shipped the other chain and tried for the nearest port. Fell in with the William Davison, from Jamaica to London, and received from the master a spar and a sail, for which he publicly thanks Captain Nares."—*Charleston Mercury.*

Second storm.

"Brig Pomeroy, off Abaco, in the gale on the 5th of August, 1837, lost her masts, and put into Wilmington."—*Ibid.*

"A severe gale of wind at Jacksonville, on the 1st of August, which continued until Sunday last, the 6th August, when it blew a hurricane from the *north-east* to *south-east.* Two government warehouses were blown down in Jacksonville, and the cotton crops destroyed."—*National Intelligencer.*

Florida coast.

"The brig Opulence experienced a hurricane on the 5th August, 1837. Hole-in-the-Wall bearing *south-west* forty miles distant; wind from *south-east* to *north-east;* lost topmasts, &c. &c."

The effect of storms in creating unusually high tides, and in deluging low lands on the border of the sea, will be frequently noticed, and this is a part of the subject of great interest.*

"DARIEN, August 10.—During the last week we have been visited by a storm which has not been equalled since that of the year 1824. The wind on Sunday last, in the morning, blew fresh from the *north-east;* in the after part of the day it shifted round to *south-east,* when the rain began to fall in heavy torrents. The wind then rose very high, and began to blow with fearful violence, tearing up the oldest oaks and mulberry-trees in the place by the roots, while limbs and branches of the different trees were flying in all directions. The water of the river then rose, and covered the rice plantations so completely, that they appeared to the eye

Inundation by the sea.

* See page 100, "Progress of the Development," &c.

CHAP. V.

Second storm.

to form part of the river. The rice, there is no doubt, will be greatly injured by the salt with which the water is impregnated. From the country, the accounts represent the cotton crops to be all but destroyed, and the corn broken down, and many houses unroofed. A letter from Jacksonville says, 'We have had the hurricane on a visit for two days. Houses innumerable have been destroyed, and two great stores have also been demolished. Our crops have shared a similar fate, especially corn, which is completely laid waste in the fields.' The vessels which had materially suffered from the hurricane are as follow :—The Bolivar, Richardson, drifted nine miles over the marsh, and left about six hundred yards from the bed of the river. Virginia in the same state. The Forester, after having dragged six miles over the marsh, left high and dry four hundred yards from the river. George and Mary, from Charleston, was lost; crew saved. The Favourite drifted over St. John's bar, and afterwards sank in Jacksonville harbour; cargo, United States' stores, lost. The Ann, after drifting six miles into the woods, was left seven hundred yards from the river. A schooner, with black bottom, on shore on Cumberland bank. A sloop on shore near Fernandi, with mast, &c., broken. Great apprehensions were entertained for the S. S. Mills, which left St. Augustine's on the 5th inst. with thirty passengers on board.'—*Times Newspaper*.

Inundation by the sea, and high tide.

"St. Mary's, August 13.—On the 5th we were visited with a very severe gale, which has done great injury to the crops and buildings. Our streets were completely *inundated* by the overflowing of the river, and persons walking were knee-deep in water. In the bay it was waist-deep, and it was not long before the place was rendered impassable. Had the wind continued for two or three hours longer there could not have been a house left standing. The oldest inhabitant does not recollect a similar occurrence, and the buildings are all more or less injured. The damage here has been estimated at from 10,000 to 15,000 dollars. The cotton, as far as I have heard, is totally destroyed."

Schooner S. S. Mills.

"The schooner S. S. Mills, from St. Augustine's, on Saturday, 5th August, 1837, for Charleston, with passengers, was overtaken by the hurricane on the 6th August, and capsized on attempting to cross the bar of St. Andrews. One man only was saved on a spar."—*Charleston Mercury, 20th August*, 1837.

(From the *Savannah Republican*, Aug. 7.)

"THE WEATHER.—We have not for some time, particularly at this season of the year, been visited with a blow equal to that we have experienced for the last five days, and we are fearful that much injury has occurred to the shipping along the coast. Our city has suffered in the prostration of trees and fences. The tide on yesterday was over our wharves, and no doubt those who have planted on low lands on the river have suffered materially." —*Times Newspaper*.

Second storm.

Coast of Georgia.

High tide, and

"SAVANNAH, August 15.—The heavy gale with which we have been visited has left us nearly desolate, and the houses left standing are much injured. All goods in the front of the stores are damaged, and many of the vessels in the harbour, after having dragged miles up the river, are left high and dry upon the marsh. The schooner America was struck by lightning, and her fore, royal, and main-topgallant-mast severely damaged; the decks ripped up, and her cargo set on fire, though not entirely consumed. The captain as he stood was stunned, and did not recover for an hour after. She was shortly to leave for New Orleans. Happily we have heard of no lives being lost, notwithstanding houses were frequently seen falling just on the eve of the tenants leaving them, whilst others were completely swept from their foundations by the water, which was from four to six feet deep in the streets. The cotton crop is totally lost; and it is considered by some who have seen several of the plantations that ten bags will not be made round the country. I suppose the destruction by hurricane in this part of the country was never before so universal. Our cotton-fields, which were good for a bag per acre, have been three feet deep in water, and our corn is utterly gone. It is impossible to estimate the damage done to the crops, buildings, trees, and fences; but it is my opinion that we shall scarcely recover in five years."—*Ibid.*

inundation by the sea.

"The schooner Erie, off Charleston bar, the 6th August, 1837, at 3 P.M. The wind suddenly shifted to the *south-east*, and compelled her to stand to the south to prevent her going on shore. Passed two disabled vessels."—*Southern Patriot*.

"Brig Franklin, Captain Schofield, experienced a severe gale on the 6th August, 1837, off Doboy Island. She was compelled to scud, and make the north end of Cumberland Island. Struck

CHAP. V.

Second storm.

three times in crossing the bar. Saw a schooner to leeward at the commencement of the storm. The schooner suddenly disappeared, but we soon saw her again, bottom upwards."—*From the New York General Advertiser.*

Extract of a letter from St. Simon's Island:

"On the 1st and 2nd of August, 1837 (in lat. 31° 2′, long. 81° 28′), we had a very severe gale here; and on Sunday, the 6th August, it commenced blowing about noon; and between 3 and 5 o'clock it shifted from *north-east* to *south-east*, and became one of the most furious hurricanes we have had since 1834. It continued to blow until midnight, or 1 o'clock in the morning of the 7th, when it abated suddenly."

"The gale, which swept along the south coast, on the 7th of August, 1837, was felt in full force at Pensacola, lat. 30° 25′, long. 87° 29′. Almost all the vessels, except the ships of war, dragged and went ashore."—*New York Gazette.*

"NEW YORK, 23rd August, 1837.—During a violent gale at Pensacola, on the 8th inst., the brigs Alvira, Rondout, and Lion, were driven on shore, and much damage done to the shipping in port. Most of the small vessels were driven on shore."—*From Lloyd's List.*

The following is a remarkable narrative:

"Cove of Cork, Dec. 14th, 1837.

Ship Judith and Esther, and Narrative of Mr. Seymour.

"SIR,—Having received yours of the 7th instant, I haste to give you every information respecting the hurricane which I was in, on board of the brigantine Judith and Esther, of Cork, which vessel I was master of, and bound from Cork to Kingston, Jamaica.

"I sailed from Cork on the 2nd of July, in the present year, for Jamaica, having carried a fair wind from the time of my departure up to the 1st of August, on which day I experienced a most dreadful hurricane, the following of which are the particulars:

Chart VI. Remarkable appearance

"On the night of the 31 stof July, at 8 P.M., in lat. 17° 19′ north, and long 52° 10′ west, the wind blowing fresh from the north-east, and all possible sail set, *I observed a white appearance*

of a round form, nearly vertical, and while looking steadfastly at it, *a sudden gust of wind carried away the topmast and lower studding-sails.* At 8.30 P.M. the atmosphere became very cloudy, and the wind increasing, we took in our small sails and took one reef in the topsail, *not observing at this time any swell* but what would have rose from such a breeze. The wind continued after this time quite steady from the north-east, and not increasing until the hour of 1 A.M. on the following morning (1st August), when the wind increased and the sea rose very fast, so that it caused the vessel to labour hard. At 6.30 A.M. on the same day, close-reefed the topsail, reefed the foresail and furled it, and close-reefed the mainsail; sent top-gallant-yards down, and housed the main-top-gallant-mast; the sea at this time very high and regular from the north-east. Seven A.M. *the wind gradually increasing*; took in the mainsail and topsail, and let the vessel run under bare poles, all hands being of opinion that she would do better running than if hove-to; the sea at this time very high, and the vessel labouring and straining much, and shipping great quantities of water: the pumps being particularly attended to. At about 8 A.M. very heavy rain, and the wind increasing to a hurricane, so that it was impossible to hear each other speak on deck, or yet do anything for our safety. She broached-to, and was hove on her larboard beam-ends, by a tremendous heavy sea, which, after she righted, we found took all the bulwarks nearly away on the larboard side. She had been for some time on her larboard beam-ends before she rose, and when she did, the wind veered suddenly to the *southward of east.* After running a short time before the wind, she was hove again on her beam-ends, which, when she righted, took all the bulwark away on the other side except a few planks; she then became again manageable for about fifteen minutes, which time was about noon. After the short time she was manageable, it fell calm for about fifteen minutes, and the hurricane suddenly veered to about *south,* when we then gave up all hopes of safety. A sea, owing to the sudden shift of wind, had struck her on the starboard side, and hove the vessel the third time on her beam-ends. *She had remained some time so,* the cabin nearly filled with water, and forecastle (though as much precaution as possible taken against it); all the boats (3), the cookhouse, water-casks, spare spars, sails, a quantity of spare rope, in fact every thing of any value was gone; the mate, who was attending as well as possible to the wheel, was washed from it, the wheel was carried away. All

Second storm. in the atmosphere. No swell.

Close reefed 6.30 a.m.

Wind increasing.

Scudding.

8 a.m.

Broached-to; twice on beam ends.

Calm.

Third time on beam ends.

CHAP. V.

Second storm.

the stanchions on the starboard side were broken, and every sail, except the mainsail, blown away into rags, though furled properly; the foretop, while on her beam-ends, nearly smashed to pieces, when to our agreeable surprise we observed her again righting, and could not account for the manner in which we were saved, but through the powerful hand of an Almighty Protector. *For nearly an hour we could not observe each other, or anything but merely the light; and, most astonishing, every one of our finger-nails turned quite black, and remained so nearly five weeks afterwards.** After she had righted, we observed the clouds break, which were from the commencement of the gale in a body, with heavy rain, the wind also abating a little; one hand managed to get below and procured a handspike, which we shipped as a tiller, and managed to get her again before the sea, which was then running tremendously high; the pumps were again got at, and kept going. This time we considered about 3 P.M., the gale then began to abate, and the sea did not break so furiously, so that we managed to set a balance reefed mainsail, and hove her to. The gale still abating, I went below, and found every article, that could be damaged by salt water, damaged: the pumps still attended to; and we found she did not make any water except what got from the cabin and forecastle. At 6 P.M. the gale greatly abated, and the sea fell fast. The appearance of the sky at this time was most remarkable, being of a deep red colour to the north, and looking very dark to the west, as if the gale was moving in that direction. At midnight the gale considerably abated and the weather appeared much better, the vessel not making any water. At 4 A.M. on the following morning, being the 2nd of August, the weather appeared as before the gale (a steady breeze from north-east), the atmosphere at this time being a dark red, and the clouds *not moving*. We at this time bent the second topsail and ran under it single-reefed, and a close-reefed mainsail. At 10 A.M. on the same day, the wind remaining quite steady, ran under a whole topsail and single-reefed mainsail; the crew being quite exhausted, I gave them the remainder part of the day for rest. The wind was at first *north-east*, and veered *easterly* to *south*, or *south-south-west*. *No swell preceded the storm.* The barometer was broken; but by the barque *Laidmans*, of Liverpool, Capt. Hughes, which arrived in Kingston four days after me, her barometer (in the lat. and long. in which I experienced the gale) was very unsteady, rising

Finger nails grew black, and crew lost their sight.

3 P.M.

Very dark in the west.

4 A.M. trade-wind returned.

Barque Laidmans felt the swell.

* A second letter on this subject follows this one.

and falling during three days, and a very heavy sea running, though not an increase of wind.

Second storm.

"Our sufferings were very great, more so than any person could imagine.

"All the within particulars are well authenticated, which will be seen by the protest now in London.

"I trust every information you require is here; and if the track of the Judith and Esther be required, I shall send you an abstract; *it is really worthy of notice.* Trusting I have not delayed this information too long, I remain your obedient humble servant, "WILLIAM SEYMOUR."

"To Lieut.-Col. Wm. Reid, R.E."

On receiving Mr. Seymour's first letter, I wrote for an explanation on certain parts of it, and the following is his answer:

"Cove of Cork, Jan. 2nd, 1838.

Mr. Seymour's second letter.

"SIR,—The information which you require I would have given you ere now, but being from home.

"Respecting the gust of wind which first alarmed us on the night commencing the hurricane? It came from a *north-east* direction, and remained so without turning until the time mentioned in my last to you.

"Secondly, as to our holding on when the vessel lay on her beam-ends the third time?

"The third time the vessel had been on her beam-ends, some of the crew were in the main rigging, and the others standing on the weather side of the companion, holding on the weather rail.

"Thirdly, as to the cause of not being able to see each other?

"The cause of this I cannot well tell; but while running before the vessel was hove the third time on her beam-ends, and while on the beam-ends, the atmosphere had quite a different appearance; darker, but not so dark that (I should imagine) would hinder one from seeing the other, or from seeing a greater distance, were it not that our eyes were affected. It was about this time our finger-nails had turned black; and whether it was from the firm grasp we had on the rigging or rails I cannot tell, but my opinion is, that the whole was caused by an *electric* body in the element. *Every one of the crew were affected in the same way.*

"I have the honour, &c.

"WILLIAM SEYMOUR."

"To Lieut.-Col. Wm. Reid, R.E."

CHAP. V.

Second storm.

These two storms lead us towards an explanation of the variable winds. The track of the Barbados hurricane, delineated on Chart V., is also marked by cruciform dots on Chart VI., and its probable place on the 6th of August is shown by a dotted circle. The places of two progressive whirlwind storms on the 6th of August, are, therefore, shown on Chart VI. By considering these figures, it will be seen, that the west wind of the first storm would become neutralized and reversed, as the second storm advanced to the place left by the first.

Hurricane of the middle of August.

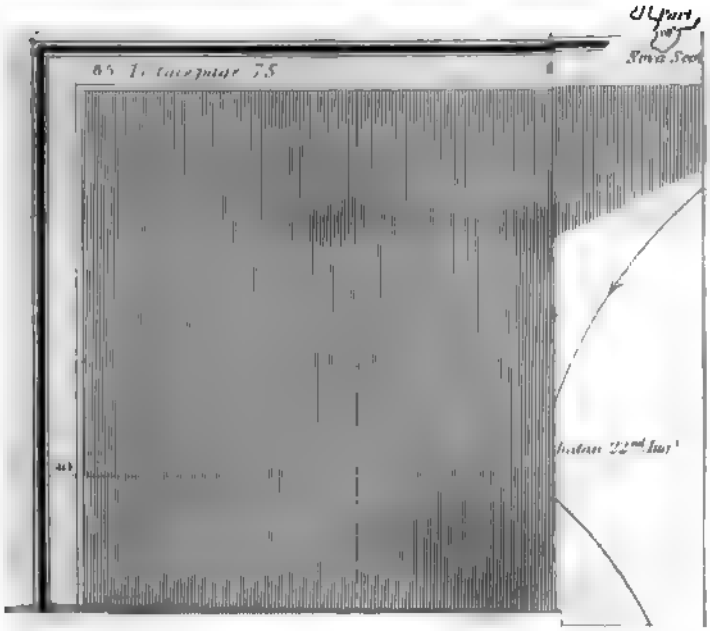
Third storm.

THE THIRD STORM.

On Chart VII. a more extensive storm is described; and as it occurred at the period when the last Jamaica ships of the season were on their passage to England, it affords a good opportunity for the investigation on the nature of storms.

I have endeavoured to procure as many logs of ships in these storms, or narratives in place of the logs, from the masters in command of the vessels as possible; yet it will be found, that there are still many to be obtained: and notwithstanding the appearance of this plate, crowded with the names of vessels, there are still others whose positions I have not been able to procure.

The barque Felicity, of Greenock, met this storm, on the 13th of August, upwards of 400 miles to the eastward of the West Indies, and somewhat to the northward of these islands; and her place is marked on the chart. Whether the storm originated there or more to the eastward I am unable to explain; but it is



remarkable, that at the commencement of the storm it was in the north-west quarter in which the sky appeared black. The wind commenced blowing from that quarter, veering to west, to south-west, and south; but I have not obtained the log in detail.

Third storm.

Three other ships met with the hurricane north-east of Antigua, viz., the Castries, the Scipio, and the Margaret; but I have only been able to get the log of the first; and her course from St. Lucia to England will be found laid down. Between noon-day of the 14th, and noon of the 15th of August, the Castries appears to have crossed the last portion the third storm; and to have had the wind veering as it would do under such circumstances, in a storm which revolved from right to left. On the 14th, the Sophia, then 800 miles from the storm, began to feel the swell from the south-east.

Castries, Scipio, and Margaret.

On the 15th the storm had reached Turk's Island; and on the 16th, it began to be felt by the easternmost vessels, then off the Bahamas: on that day the Mary Sharpe was dismasted; on the 17th the Calypso was upset.

At midnight on the 18th, the Rawlins will be found *becalmed in the centre* of this great storm; now extending over a circle of 600 miles in diameter. If such a circle be described, and we turn to the log of any ship (as for example the Sophia) which the circle includes, we shall find the veering of the wind such as it would be in a rotatory storm. A short time before the centre of the storm reached the ship Rawlins, the Sophia had the wind from the east-north-east. By degrees, as the northern portion of the storm was passing over the Sophia, the gusts came from the *east*, and then from

Chart VII.

CHAP. V.

Third storm.

the east-south-east, for the hurricane was then moving towards the north-west: and when the storm suddenly changed its direction (as so many of these gales do on approaching this part of the coast of America), then we find by Mr. Barclay's narrative, that on the afternoon of the next day, the wind backed to the *east* and then to *north:* for the storm proceeding now towards the north-east, left the Sophia in the left-hand semicircle. The West Indian (Turner), like the Rawlins, will be found becalmed in its turn: and the log of the Rawlins contains a remark on "the dismal appearance to the north-west:" which points at the place of the West Indian at this period. If a new circle be now described with the same radius, and with the place of the West Indian as a centre, this circle will reach the Penelope; and if we turn to Mr. Grimes's narrative, we shall find his ship beginning to feel the hurricane about this period of its course.

See log, Aug. 20th and 21st.

This will explain the mode of investigation adopted: but to render it as satisfactory as the subject is capable of being made, the log of every ship on Chart VII. should be procured and printed: to obtain them all has been beyond my power; for although I have found in every quarter a strong desire to aid this inquiry, the masters of ships are too busily employed when in port to copy out the necessary documents. I shall now give the data procured, such as they are; and afterwards endeavour to explain the fourth and fifth storms.

Most of the ships placed on this chart were drifting with the Gulf-stream during the storm, at a time when no observations could be got. Their actual places, therefore, during the storm, cannot be ascertained with exactness; but the evidence from the reports leaves

little doubt but that this great storm, like the others, was rotatory and progressive. The following are the documents:

Third storm.

"St. Augustine, 19th August, 1837.—On Tuesday, the 15th August, we were visited by a *third gale of wind*, of equal severity with the two which preceded it, and which continued until the afternoon of Friday, 18th August, when it ceased."—*American Newspaper.*

"The schooner James Busick, sailed from Norfolk, U.S., for the West Indies, but returned, being damaged in a severe gale on the 14th August, which continued with violence for thirty-six hours."—*Ibid.*

"A severe gale at Turk's Island on the 15th August."—*From Lloyd's List.*

Narrative of Mr. Wilkinson, Master of the Calypso, in the storm of the middle of August, 1837.

Ship Calypso.

"On the 15th August, at noon, the Calypso was, by observation, in lat. 26° 47′ north, and long. 75° 5′ west; the wind was from the eastward, about *east-north-east;* she had royals and fore-topmast-studding-sail set: shortly after, we got a heavy swell from the north-eastward, and the wind freshened gradually till 9 o'clock, when only the double-reefed topsails, reefed foresail and mizen, could be carried. During the night the wind increased, and day-light (the moon about full) found the vessel under a close-reefed main-topsail, with royal and top-gallant-yards on deck, and prepared for a gale of wind. At 10 A.M. the wind about *north-east,* the lee-rail under water, and the masts bending like canes; got a tarpaulin on the main rigging, and took the main-topsail in; the ship labouring much, obliged main and bilge-pumps to be kept constantly going. At 6 P.M. the wind *north-west,* I should think the lat. would be about 27°, and long. 77°. At midnight the wind was *west,* when a sea took the quarter-boat away. At day-dawn, or rather I should have said the time when the day would have dawned, the wind was *south-west,* and a sea stove the fore-scuttle; all attempts to stop this leak were useless, for when the ship pitched the scuttle was considerably under water: I then had the gaskets and lines cut

Chart VII.

Heavy swell.

Close-reefed.

Took in topsail.

Fore-scuttle stove.

CHAP. V.

Third storm. Whilst cutting masts ship went over.

from the reefed foresail, which blew away; a new fore-topmast-studding-sail was got up and down the fore-rigging, but in a few seconds the bolt-rope only remained; the masts had then to be cut away. My chief mate had a small axe in his berth, which he had made very sharp a few days previous; that was immediately procured; and while the men were employed cutting away the mizenmast, the lower yard-arms went in the water. It is human nature to struggle hard for life; so fourteen men and myself got over the rail between the main and mizen rigging, *as the mast-heads went into the water:* the ship was sinking fast; while some men were employed cutting the weather-lanyards of the rigging, some were calling to God for mercy; some were stupified with despair; and two poor fellows, who had gone from the afterhold, over the cargo, to get to the forecastle, to try to stop the leak, were swimming in the ship's hold. In about three minutes after getting on the bends, the weather-lanyards were cut fore and aft, and the mizen, main, and fore-masts went one after the other, just as the vessel was going down head foremost.

"She then righted very slowly. On getting on board again, I found the three masts had gone close off by the deck: the boats were gone, the main hatchesstove in, the planks of the deck had started in many places, the water was up to the beams,

Third storm.

and the puncheons of rum sending about the hold with great violence; the starboard gunwale was about a foot from the level of the sea, and the larboard about five feet; the main and mizen-masts were held on the starboard side by the lee-rigging, and the foremast was kept from floating from the starboard side by the stay. The sea was breaking over the ship as it would have done over a log. You will, perhaps, say it could not have been worse, and any lives spared to tell the tale. I assure you, Sir, it was worse; and by Divine Providence, every man was suffered to walk from that ship to the quay at Wilmington, although the main and bilge-pumps were broken! The wind, from about noon of the 16th till about 10, or noon of the 17th, blew with nearly the same violence. There was no lull; neither did it fly from one quarter of the compass to the other, but backed from *east-north-east* to *south-west*, and then died away gradually. On Sunday, while beating off Rum Key, the wind was variable and squally. On Monday, in lat. 24° 40′, long. 74° 45′, had fine steady winds from the eastward. Tuesday I have described. I had no barometer; but from the appearance of the weather on Monday and Tuesday morning, I did not apprehend we should have had bad weather.

"We shall now return from noticing the winds and weather, to see the Calypso safely anchored. After fishing the pumps, and getting them made air-tight, by putting candles and winding new canvass round, they were set to work, notwithstanding the seas breaking constantly over. The weck of the masts was cleared, about sixty puncheons of rum stove, and the men remained night and day at the pumps, till Monday the 21st, when the water in the hold having decreased to nine feet, a spare spar was lashed to the paul-bolts for a jury-foremast, and a topsail set on it, the wind being then southerly. On Tuesday, the spritsail-yard was turned into a jury-mizenmast, and an old foresail set on it, that being the only sail, except the jib of the sparesail, that was not entirely destroyed. On Wednesday, got the pumps to suck, and set the jib forward: there being only two-thirds of a puncheon of water, two bags of damaged bread, and a barrel of pork, but no cooking apparatus on board, were obliged to go on an allowance of one pint of water each per day. The condition the men now were in was indeed very bad; they were worn down with fatigue, had lost all their clothes and bedding, and were *covered with boils*. On Friday, shortened the allowance of water to half a pint each per day, and remained in

CHAP. V.

Third storm.

that condition till the 30th, during the days, under a scorching sun, and at night laying on deck. On the 30th, in lat. 32° 25′, and long. about 78½° W., we fell in with the American brig Rupert, from Havannah to New York: the generous captain immediately sent a puncheon of water, some fruit, and many little luxuries, for which I shall ever feel grateful. This was the third vessel we had spoken since the hurricane, but the only one that assisted us. The first had had his deck swept, and could spare nothing; the second was an American brig, that we fell in with at night, and hailed, telling him our distress: he asked if we could remain on board till daylight: and when I told that I only wanted provision and water, he surlily asked, 'What ship is that? where are you from? where are you bound to then? what's your longitude?' When all his questions were answered, he hauled his wind, and at day-dawn in the morning could just be seen on the horizon. *On the 31st of August* we sighted the land, about thirty miles to the southward of Cape Fear, but *the wind coming more from the eastward*, had to bring up in five fathoms water. During the night *the wind increased*, but fortunately *backed into the northward* (which was off the land), and at noon on the following day *blew a very heavy gale of wind*, and continued until the *morning of the 2nd*, when it *backed to the west-north-west*, and moderated: we then slipped the cable, and sailed along the land for Baldhead lighthouse. At noon we got a pilot on board, and anchored once more in port. We were kindly received by the good people at Smithville and Wilmington, who complained bitterly of the late storm, for many of their houses were uproofed, and trees blown down.

Fifth storm.

(Signed) "GILBERT WILKINSON."

"To Lieut.-Col. Reid, R.E."

Two paintings of the ship have been made by the marine-painter, Mr. Huggins, under the direction of the master, Mr. Wilkinson, which Mr. Huggins has reduced for this work. The first shows the crew on the ship's bottom cutting the weather-rigging, and is placed where that act is described by Mr. Wilkinson.

The other is the Calypso under jury-masts, and the crew bringing their ship into Wilmington. The

"*shifting of the wind to the eastward, and its increasing*," will be again adverted to, in illustration of our subject: it was the fifth storm and came from the *west*.

Third storm.

The Calypso appears to have been upset just after half the storm had passed over, and to have been very nearly, although not quite in the centre of its course.

"The brig Mary, Sharp, dismasted and lost her rudder on the 16th August, lat. 27° 30′, long. 73° 50′."

"The brig Cumberland put into Nassau, having experienced a hurricane on the 15th August."—*Lloyd's List.*

"The Mary, Sharp, from New Orleans to Barbados, was abandoned on the 5th September, lat. 32°, long. 80°, having been dismasted and thrown on her beam ends, with six feet water in her hold, in a gale on the 16th August, in lat. 27° 30′, long. 73° 53′."

"The Neptune from Jamaica to London, was dismasted in this storm."

CHAP. V.

Third storm.

"The Jennet, Gibson, from Honduras to London, was capsized in a gale on the 21st August. On the 3rd September the crew arrived at Rhode Island."

"The Emerald saw the Rosebud, of Glasgow, on the 23rd August, in lat. 34°, long. 75°, a wreck; stood for her, and found her *derelict*."—*Lloyd's List.*

"The Duke of Manchester was thrown on her beam ends, and lost her mainmast in a gale on the 18th and 19th August, lat. 32°, long. 77°."—*Ibid.*

"The brig Yankee, on the 16th August, in lat. 24° 30′, long. 70° 30′, experienced a severe gale of wind from north-east to south-south-west, which lasted until the 20th. Lost her foresail, main-topsail, &c. &c."—*New York General Advertiser.*

"The packet ship Sheridan, Russell, arrived at New York, on the 28th August, from Liverpool. On the 22nd August, in lat. 39° 45′, long. 68° 33′, experienced a hurricane, which took away the fore and main-topsails (double-reefed) from the yards entirely, leaving nothing but the bolt-rope standing."

"PHILADELPHIA, Aug. 19.—The Mecklenburg brig Harmonie, Galle, from New York for Alexandria, was driven on shore fifty miles to the southward of the Capes on Saturday night last in the gale; the captain has come to town for assistance, and states that the vessel is perfectly tight, and can be got off without much damage."

"NEW YORK, Aug. 31.—The Hindley, Turner, from Laguna for Liverpool, which was off Sandy Hook on the 16th inst., dismasted, has been brought up to this port; the three lower masts have been replaced without discharging, and it is expected she will be able in a fortnight to proceed."

"Sept. 8.—The barque Wanstead, arrived here from London, experienced on the 23rd August, in lat. 43° 34′, long. 54° 20′, a severe gale of wind; lost boat, stove bulwarks, and washed seven men and the captain overboard, and succeeded in getting them on board again."

"The Rosebud, Dick, from Havannah to London, was capsized and dismasted on the 18th August, in lat. 34°, long. 74°; fallen in with by the General Sumpter, Bonnet, which attempted to tow her into the Chesapeake."—*Lloyd's List.*

Third storm.

Extract from an American newspaper, dated Wilmington, August 25:

"On the afternoon of Friday, the 18th, the wind shifted to the north-east, and rain began to pour heavily. Before midnight the storm increased, threatening ruin; and daylight revealed to us uprooted trees, and our streets washed into gullies, roads obstructed, and bridges carried away. [Then follow the details of injury done to buildings.] The embankments of the sea it is said have given way, and that two new inlets are formed opposite M'Rae's, of Peden Sound. The tide rose six feet higher than usual."—*Charleston Mercury.*

High tide.

Dikes broken.

"NEWBOURNE, N.C., Aug. 25.—A severe gale commenced on Friday, the 18th, at midnight, and continued until Sunday, 20th, at daybreak."—*Ibid.*

"There was a severe gale at Charleston on the 17th, 18th, and 19th of August."—*New York Daily Express.*

"The William Thompson, which arrived yesterday from Jamaica, having sailed on the 29th July, and come by the windward passage, encountered a hurricane in lat 38°, long. 60°, on the 21st and 22nd of August, 1837."—*Lloyd's List, 19th Sept.*

"The Lady Katharine Barham, from Jamaica; in a hurricane 16th, 17th, and 18th August, 1837, in lat. 29°, long. 77°."

"The Brilliant, from Jamaica, experienced a violent hurricane on the 18th of August, 1837, 120 miles south of Cape Hatteras, which lasted to the 21st."—*Ibid. 18th Sept.*

CHAP. V.

Third storm.

"The Westchester, from Havannah, experienced a heavy gale *from the north-east*, on the 18th and on the 20th, in lat. 32°, long. 74°."

"The James Ray, from Jamaica, sailed 1st August, and came the Gulf passage; experienced dreadful weather, particularly on the 16th and 19th."—*Lloyd's List.*

"The Maria, from Honduras to London, on the 20th of August, in lat. 30°, long. 74°, capsized. A boat's crew picked up by the Hogarth, from New Orleans, bound to New York."—*Ibid.*

"The Argus, on the 20th and 21st of August, experienced a heavy gale *from east*, and suffered damage."—*New York General Advertiser.*

"The Mecklenburg brig Harmonia was run on shore, fifty miles southward of the Cape, on Saturday night last, 19th August, in the gales."—*Ibid.*

"The ship Napier, from Liverpool, 19th August, off Cape Henry, experienced a heavy gale *from east* and *east-north-east*."—*Ibid.*

"Captain Robinson, of the Maria, was saved in his boat, with his crew. The Maria was capsized on the 20th August."—*Ibid.*

"LIVERPOOL, Aug. 4.—The Experiment, arrived here from Nassau, experienced a hurricane on the 20th of August, and lost sails, &c. There were *two* severe gales at Nassau previous to the 12th of August, and several vessels lost."

"The barque St. Helena, on the 18th and 19th August experienced heavy gales *from the north-east* and *north*. At 7 P.M., on the 19th, lost the close-reefed main-topsail, lying-to. Wind shifted to north-west, and blew a hurricane for twenty-two hours, during which time she lay-to under five yards of canvass in the mizen-rigging; rail under water part of the time."—*Ibid.*

Third storm.

"The steam-packet Columbia, from New York to Charleston, experienced a severe gale on the 20th August, *from east* to *north-west*."—*New York General Advertiser.*

"The Powhatam, Chase, from Malta and Gibraltar to New York, on the 22nd August, lat. 40°, long. 67° 30′, experienced a tremendous hurricane from *east-south-east* to *north*, and lost both top-gallant-masts."—*Ibid.*

"PHILADELPHIA, August 30.—Arrived the ship Ellen Mar, from Cronstadt, and the Citizen, from New Orleans, in distress. On the 18th, had experienced a hurricane; on the 22nd, picked up Captain Tilley and the crew of the Ida, from Jamaica, bound to London."

"The barque Chief, Eldrige, from Charleston for Boston, suffered severely in a gale on the 19th August, off Frying-pan shoals. On the 21st August spoke the Duke of Manchester, lat. 34° 12′, long. 74°, main and mizen-masts gone."—*Ibid.*

"The brig Pensacola, on 18th August, lat. 31°, long. 79° 30′, encountered a heavy gale; carried away tiller and foremast."—*Ibid.*

"EXPRESS MAIL.—A *third* storm has visited the Floridine coast, but the details are not yet known."—*Ibid.*

"A severe gale was experienced at Washington, Edenton, North Carolina, on the 18th August. Great damage has been done, and several vessels have been lost; one of them, with the crew, on the bar of Washington."—*Ibid.*

"The Oglethorpe, on the 13th August, experienced a violent gale from the *north-west*. (Lat. not given.)"—*Ibid.*

"Captain Robinson and crew of the Maria, of Hull, were picked up by the Hogarth."

"The Brig Vincennes, from Teneriffe to New York, in lat. 35° 30′, long. 65° 40′, on the 21st August, experienced a heavy gale from *south-south-west*."—*Ibid.*

CHAP. V.

Third storm.

"The brig Delos, Smith, from Leghorn and Gibraltar, on the 21st August, in lat. 37° 40′, long. 66° 30′, had a gale *from the south* and *south-east*; on the 22nd she had moderate weather."—*New York General Advertiser.*

On the 4th of August the ship Sophia, from Jamaica to England, was between the Islands of Cuba and Hayti. She was then within the influence of the second storm, as marked on Chart VI., having a heavy swell rolled back by that storm from the north, and the trade-wind reversed by the same gale. A break will be found in this Log-book, between the 6th and 13th of August.

Ship Sophia feeling second hurricane on Chart VI.

An Account of Part of the Voyage of the SOPHIA, J. Barclay, Master, from Jamaica to London, in August, 1837.—In *Nautical Time.*

Hour.	Wind.	Bar.	Ther.	Remarks.
Noon	S W	set fair		Thursday, August 4, 1837. Wind S W; a fine steady breeze, with a peculiar haze round the horizon; the sky heavy to the northward, and clouds meeting it from S W: at noon, doubled Cape Maize: *met a heavy sea from the northward;* the water covered with dried wood, evidently washed off the neighbouring bushes very recently; barometer standing at set fair.
P. M.	S W	set fair		Friday, August 5, 1837. Wind S W; steady breeze; sun obscured by thick haze; head sea making the ship plunge much; obliged to shorten sail and lower the topsails on the caps; at 6 P.M. spoke an American schooner from Port-au-Prince, apparently prepared for and anticipating a breeze; at midnight, reefed the foresail and close reefed the topsails; squally; barometer as yesterday; at daylight made all sail, the sea having fallen considerably; at noon, wind S S W; fine breeze; the sun partially obscured by *reddish haze;* latitude observed 21° 52′, longitude p. chronometer 74° 10′ 30″ W; barometer stationary at set fair.
	S S W			

Trade wind reversed.

Account of the Voyage of the SOPHIA—*continued*.

Hour.	Wind.	Bar.	Ther.	Remarks.	
				Saturday, August 6, 1837.	
P.M.	S W	set fair		Wind S W with the same appearance; at 2 P.M. saw Castle Island N N W about four leagues; at 3, perceived two vessels onshore on their beam ends, with a signal of distress flying, and tents on the beach; proved to be two Nassau wreckers, cast away the day before in a violent hurricane from the northward, which they gave a terrific account of. From this date to the 13th inst. fine weather, with the wind from N E to E.	Ship Sophia in second storm.
	N E to E				
				Sunday, August 13, 1837.	
P.M. A.M.	E	fair		Wind E; squally with rain; A.M. dark and cloudy with thunder and lightning; at noon, observed in lat. 27° 20′, long. p. chronometer 74° 57′ 20″; barometer at fair.	Chart VII.
				Monday, August 14, 1837.	
P.M. A.M.	E	fair		Wind E; moderate; *observed a long swell coming from the southward and eastward;* A.M. squally; made and shortened sail as necessary; at noon, dark cloudy weather; latitude by indifferent observation 28° 38′, long. 74° 50′ 15″; barometer at fair.	Swell of third hurricane from S.E.
				Tuesday, August 15, 1837.	
....	E	fair		Wind E; steady, but light all these 24 hours; swell still from the S S E; lat. observed 29° 50′, long. p. chronometer 74° 37′ 20″ W; bar. as yesterday.	Swell from S.S.E.
				Wednesday, August 16, 1837.	
P.M. A.M.	E N E	fair		Wind E N E; steady and moderate, with a heavy lowering sky; at 4 P.M. in top-gallant sails and gaff-topsail: at midnight, do. weather; A.M. breeze freshening; at noon, strong breeze with a very stormy appearance, the swell evidently increasing; latitude observed 31° 37′, longitude p. chronometer 74° 54′ 30″; barometer at fair.	Swell increasing.
				Thursday, August 17, 1837.	
P.M. A.M.	N E by E change			Wind N E by E; steady; the sky loaded to the eastward with heavy sluggish clouds, and apparently no distance over head; at 3 P.M. down royal yards; at 6, breeze freshening; in first reef of the topsails; at 7, in spanker, jib, and mainsail, set the trysails, and in second reef of the topsails: at midnight, strong gale with a high cross sea; up foresail; the mercury much agitated and inclined to fall; at 6 A.M. set the foresail again; at noon, very hazy round the horizon, with the appearance over head as yesterday; latitude 33° 3′ N, longitude p. chronometer 75° 9′; barometer fallen to change.	Clouds low. Bar. falling

CHAP. V.

Account of the Voyage of the SOPHIA—*continued.*

	Hour.	Wind.	Bar.	Ther.	Remarks.
Third storm.					
Storm approaching.	P.M.	E N E	change		Friday, August 18, 1837. Wind E N E with the same wild appearance, and every indication of a dangerous change of weather; at 3 P.M. wore ship to the southward; in foresail and main-staysail; at midnight, do. weather; barometer still falling; wind E; gale increasing; close-reefed the topsails and stowed the foresail; at daylight, in fore and main-topsails, down top-gallant-yards, and housed the top-gallant-masts; in jib-boom, and stowed jib and fore-topmast-staysail in the net; came-to under the storm mizen and main-trysail; at noon, heavy gale of wind E S E; sea running very high, the ship labouring much; the sky as if closing around us, and having a most dismal appearance: no observation; barometer from stormy to change, but impossible to set it in consequence of the ship's labouring; in dead lights.
		E	falling		
Hove-to.		E S E			
			stormy to change		
	P.M.	S S E			Saturday, August 19, 1837. Heavy gale with violent squalls and rain; at 6 P.M. blowing a hurricane, the sea continually breaking over the ship; one pump constantly kept going; at 11.30, shipped a tremendous sea, which carried away the whole of the bulwarks and some of the stanchions on both sides of the main deck, some spare spars, and lee-beam; at midnight, the scene most appalling, the wind lashing the foam and rain, so as to render it impossible to look to windward; the ship literally under water forward; about this time the starboard quarter-boat was blown from her lashings, and we saw no more of her; at 3 A.M. gale harder, if possible; blew the main-trysail completely out of the bolt-rope, at the same time a succession of seas breaking over the ship, swept every thing off the decks but guns and long-boat; turned the hands up and rigged both pumps; at noon, not the least appearance of a change; wind S S E; dismally dark, and no observation; barometer as yesterday; wore ship.
	A.M.				
Wore.					
See remarks, page 75. Storm recurving.	P.M.	S S E	stormy to change		Sunday, August 20, 1837. No alteration until 10 P.M. when the wind backed to the *eastward*, blowing as hard as ever; at midnight, do. weather, the same terrific appearance; A.M. the *gradually backing to the northward* with no abatement; at noon, wind N N W but not the least abatement; no observation; barometer as yesterday.
	A.M.	N N W			

Account of the Voyage of the SOPHIA—*concluded.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				Monday, August 21, 1887.
P.M.	N W			At 1 P.M. wind at N W, the sea a-beam and breaking over them as if determined to destroy all before it; got the storm mizen in and stowed; let her drift under bare poles; at 6, more violent, if possible; had the bulwarks on the poop washed away, and the larboard quarter-boat stove; at 8, set the mizen again; the breeze inclined to moderate, and the mercury to rise; at midnight, still dark and gloomy; mercury getting up fast: at daylight, moderated a little, and inclined to clear up; bore up and set the close-reefed topsails and foresail; at 9 A.M. got sights for the chronometer; barometer rising rapidly; at 10 A.M. made more sail, with a fine steady breeze from the westward; ship making one foot of water per hour; at noon, observed in 34° 38′ N, longitude per chronometer 74° 20′ 30′ W, having made since last observation, against wind and sea, ninety-five miles of northing, and forty-nine of longitude; barometer at fair.
		rising		
A.M.	W	rising rapidly		
		fair		

Third storm.

Drifting under bare poles.

"From this date to the 3rd of September we had variable winds and fine weather. On that day we spoke a brig from Matanzas to Bremen. She left Cuba on the 18th of August, with a fine westerly breeze, which brought her through the Gulf of Florida, and alongside of us, over the same ground where so much damage had been so recently done.

The Bremen brig.

"In 1824, when I commanded the ship New York Packet, we encountered in September, homeward bound, to the northward of Bermuda, a heavy gale from south-east, which continued for two days, *when it suddenly became calm. A small clear spot appeared in the opposite quarter,* north-west; and in a very short span the ship was on her beam-ends, with her lower yards in the water, from the action of the wind *upon her spars and rigging alone.* I was obliged to cut away some of her masts, or she must have foundered.

A calm.

Storm's eye.

"In August, 1832, between the Havannah and Matanzas, in the Sophia, I experienced a similar breeze to this last one, in company with several other Jamaica ships. I paid close attention to the barometer, and other signs of a change of weather; and having prepared accordingly, suffered little or nothing in spars or rigging, when some of those in company were dismasted.

CHAP. V.

Third storm.

On that occasion, ships not thirty miles off were not aware of it. *It began at south-east, and going round the compass, westward,* ended where it began in six hours.

(Signed) "JAMES BARCLAY."

Ship Rawlins.

Narrative of Mr. MACQUEEN, Master of the Ship Rawlins, from Jamaica to London.

			°	′
"Latitude —	Commencement,	N.	30	30
"	Termination,		30	40
"Longitude—	Commencement,	W.	77	40
"	Termination,		77	18

"Dates—17th, 18th, 19th August.

"Wind commenced at *north-east by east,* blowing strong from that quarter, about twelve hours, then suddenly veered to *north,* continuing with unabated vigour until midnight of 18th; in an instant a perfect calm ensued for one hour; then quick as thought the hurricane sprung up, with tremendous force, from *south-west,* not again shifting from that point. No swell whatever preceded the convulsion. The barometer gave every notice of the coming gale for many previous hours. Two days antecedent the weather beautifully serene, but oppressively hot, with light shifting airs; barometer during that time standing at 'set-fair,' during the gale *as low as almost to be invisible in the tube,* above the frame-work of the instrument. The force subsided at midnight, August 19th; the sea tremendous, and rising in every direction; from the force of wind no tops to the waves, being dispersed in one sheet of white foam; the decks tenanted by many sea-birds, in an exhausted state, seeking shelter in the vessel; impossible to discern, even during the day, anything at fifty yards distance; the wind representing numberless voices, elevated to the shrillest tone of screaming; but few flashes of lightning, and those in the south-west. A very heavy sea continued for some days after.

Calm for an hour.

Bar.

(Signed) "GILBERT MACQUEEN,
"Commander of the ship Rawlins."

In the log of the Rawlins, on the 20th August, A.M., there is this expression:—

"The wind and sea much abated. A dismal appearance to the *north-west.*"

This was the direction in which the centre of the storm had moved.

Narrative of Mr. Turner, Master of the Ship WEST INDIAN,* from Jamaica to London.

Hour.	Wind.	Bar.	Ther.	Remarks.	Third storm.
		30.1		August 14, 1837. Water smooth, and fine weather. Latitude observed 28° 28′ N; longitude by chronometer 79° 45′ W; current N ½ W 90 miles since the previous noon.	Ship West Indian (Turner).
P.M.	E N E	30.1		August 15, 1837. Wind light from E N E; smooth water. At 5 P.M. this day the weather put on an unsettled appearance, and a strong swell began to set in from the *east-north-east*, which continued to increase, as did also the wind from the *north-east*; the next morning the sky more settled. Latitude observed 31° 9′ N; longitude by chronometer 79° 59′ W; current N ½ W, 90 miles since the previous noon.	
P.M.	E N E	30.0		August 16, 1837. No current perceptible these twenty-four hours, although when the ship was tacked at 5 P.M. last evening, and quite on the inner edge of the Gulf-stream, the water at the surface was like a boiling cauldron; the heat of the water 8 and 10 degrees warmer than the air, which became equal about midnight. Fresh winds, variable *from east-north-east to north-east*, gradually increasing. Latitude observed 31° 45′ N; longitude by chronometer 77° 59′ W.	
P.M.	E N E	30.0		August 17, 1837. Blowing fresh from yesterday, with a heavy swell from the E S E (wind being *east-north-east*); ship under reefed courses and double-reefed topsails. At daylight this morning the sky put on a very threatening aspect; ship's head to the E S E, with a tremendous sea from E S E; wind and sea continued to increase all day, with rain; barometer not falling until 5 P.M., when it went down suddenly 6‴; ship then under reefed forecourse and close-reefed main-topsail; top-gallant-yards and mast on deck, jibboom and mizen-topmast housed; at midnight, took in forecourse.	Ship on port tack. Swell from E.S.E.
A.M.				The hurricane had now commenced, 3 A.M. of the 18th; in main-topsail; hurricane at its meridian; wind now about *east-north-east*. Latitude by account 31° 32′ N; long. by account 77° 13′ W.	Wind from E.N.E.

* There were two ships of this name in the storm.

CHAP. V.

Narrative of the Ship WEST INDIAN—*continued.*

	Hour.	Wind.	Bar.	Ther.	Remarks.
Third storm.					August 18, 1837.
			29.1		Ship now lying-to; main-topsail sheet partially hauled aft; the wind *drawing more easterly;* constant heavy rain; sea running very high. At 6 P.M. the wind was *east-south-east;* struck by a sea; nearly swept the decks; carried away quarter-boats; did considerable damage to quarter-gallery. The wind still increasing to the *southward;* just after midnight of the 18th it fell nearly calm; set main-topsail, and let a reef out to steady ship. At 2 A.M. *came out in an instant, with all its former violence,* from the *south-west;* could not attempt to wear the ship on account of damage sustained on larboard quarter. Latitude by account 31° 8′ N; longitude by account 77° 56′ W.
	P.M.	E S E			
Calm, and let a reef out.	A.M.				
		S W			
					August 19, 1837.
Hurricane returned.			28.8		Hurricane still continuing, with all its former violence; at midnight of the 19th it moderated a little, wind *veering to the westward all the time;* at 4 A.M. the wind *about west;* got the ship before the wind under close-reefed topsails, and scudded before the gale; a tremendous cross sea. Latitude by account 31° 21′ N, 78° 6′ W.
	A.M.	W	rising		
					August 20, 1837.
Scudded 24 hours.			29.5		Continued to run before the gale all these twenty-four hours, the wind getting round to *north-west;* heavy cross sea. At noon, latitude by account 31° 42′ N; longitude by account 77° 14′ W.
		N W			
					August 21, 1837.
			29.5		Now find the ship has been in the Gulf-stream great part of the time since the last observations were obtained. In four days ship has been set N 52° E 130 miles; for some days after had very unsettled weather, with a great deal of sea. At noon, latitude by observation 33° 32′ N; longitude by chronometer 72° 13′ W. (Signed) H. TURNER.

The brig Mary left Port Royal, Jamaica, on July 30, 1837, and followed nearly the same track as that laid down for the Palambam and Duke of Manchester, which will be found on Chart VI. The Mary's place for the 16th August will be found on Chart VII.

She was, therefore, behind the two first storms, but before the third.

Third storm. Brig Mary.

Extract from the Log of the Brig MARY, J. R. Crosbie, Master, from Jamaica to Liverpool. Sailed from Kingston, July 29, 1837; Port Royal, July 30, 1837. Nothing particular occurred until the 3rd August, commencing with incessant rain, thunder, and lightning; a heavy cross sea.—*Civil Time.*

Hour.	Wind.	Bar.	Ther.	Remarks.
	ESE	29.10	82	August 16, 1837. Wind ESE; current NNE two miles per hour; latitude observed 32° 21′, longitude p. chronometer 77° 50′; barometer 29.10; thermometer, shade 82°, water 82°.
	E by N NE by E	29.00	82	August 17, 1837. Wind E by N, NE by E; strong gales and heavy squalls, with a head sea from NE; barometer 29.00; thermometer, shade 82°, water 82°.
	ESE	falling 28.70	80	August 18, 1837. Wind ESE; increasing gales; struck top-gallant-yards and masts; secured all on deck; every appearance of bad weather; barometer falling fast; labouring and straining; lying-to under balance-reefed trysail; barometer 28.70; therm., shade 80°, water 82°.
	SE	28.60	76	August 19, 1837. Wind SE; gale increasing to a perfect hurricane; under bare poles; barometer 28.60; thermometer, shade 76°, water 80°.
	ESE	rising and falling 28.50	74	August 20, 1837. Wind ESE; sea making a complete breach over all; barometer rising and falling very fast; unsettled for the last twenty-four hours; seldom get below to look at it; barometer 28.50; thermometer, shade 74°, water 78°.
A.M.	SE to NW	28.10	70	August 21, 1837. Wind from SE to NW; barometer 28.10; a terrific appearance; thermometer, air 70°, water 76°; under bare poles; nothing can withstand the wind at present; secured all on deck as well as possible; sent all but three men off deck; at 5 A.M. tremendous sea struck the vessel on the larboard bow, which took away all

Third storm commencing.

CHAP. V.

Third storm.

Extract from the Log of the Brig MARY—*continued.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				bulwarks, stancheons, boats, spars, water-casks, caboose, and every moveable off deck, stream and kedge anchor; vessel laying on her broadside, unfortunately lurched; one seaman overboard; picked him up, with imminent risk of my own life, but he had his leg broken, and another man his arm, and had more men disabled; one man found himself under the foretop when he recovered himself; the hurricane continuing to rage more and more, every exertion made to save as much as possible; at noon gale abating; barometer rising gradually; I could not leave the deck to note it, but it certainly must have been lower, noon 28.40; thermometer, shade 76°, water 76°; P.M. latitude 36° 12′ N, longitude p. chronometer 72° 11′ W; a turbulent cross sea; vessel very laboursome; midnight, set the reefed square mainsail, all other sails being blown away.
P.M.		rising 28.40	70	
	S W	28.80	Ther. broken	August 22, 1837. Wind SW; made all sail that circumstances would permit; heavy rain, thunder, and lightning; latitude 36° 22′, longitude 76° 6′ W; barometer 28.80; thermometer broken.
	S W to N W	28.90		August 23, 1837. Wind S W to N W; latitude 36° 22′, longitude 68° 17′; barometer 28.90.
	N by E	29.00		August 24, 1837. Wind N by E; latitude 36° 13′, longitude 66° 45′; barometer 29.00; moveable and gloomy.
	N W	29.00		August 25, 1837. Wind N W; latitude 36° 35′, longitude 65° 38′; barometer 29.00.

"The remaining part of the passage strong breezes from the westward; barometer rising gradually.

(Signed) "J. R. CROSBIE, Master of the brig Mary."

Third storm.

Extract from the Log of the Barque PENELOPE, J. H. Grimes, Master, from Jamaica to London.—In *Nautical Times*.

Hour.	Wind.	Bar.	Ther.	Remarks.
				August 19—*Nautical Times*.
P.M.	ESE			Strong gales and cloudy. At 4 P.M. (18th mean time) larboard pump choked; ship labouring much, and making a great deal of water; midnight, strong gales; kept the ship off the wind occasionally, to pump the ship out with weather-pump; at 3 A.M. (19th) wore ship to the southward; took in forecourse, and close-reefed the topsails; wind ESE; at 6 A.M. wore ship to northward; at 10 A.M. (19th) hard gales; in fore-topsail and fore-topmast staysail, and hove to under close-reefed main-topsail; latitude, by account at noon, 34° 56′ N, longitude 75° 2′ W.
A.M.				
				August 20—(19 P.M. *Civil Time*).
P.M.	NE			Hard gales, and a heavy sea; at 4 P.M. (19th) gale increasing; starboard pump constantly going; ship labouring much, and making much water; at 8 P.M. (20th) tremendous gales; ship laying with gunwales in the water, on the larboard tack; at 11 P.M. hoisted the fore-topmast staysail, and wore ship to the NE; a very heavy sea running, when the ship came to the wind on the other tack; fore-topmast staysail blew away, and the main-topsail was split; midnight, a heavy sea broke on board and washed the boats to the leeside of the deck, and carried away bulwarks on both sides, fore and aft; at 2 A.M. (20th *civil time*) set main-trysail, to keep ship to; in five minutes it blew away in tatters; wind from E to SE; one pump constantly going; at 4 A.M. sounded the well, and found nearly three foot water in the weather-pump; called all hands to the pump, and found the sand had washed from the bottom of the larboard pump; set both pumps on; at daylight found the plankshear on the larboard side had started off half an inch for three feet in length; at 8 A.M. wind moderated; secured the long-boat and spare anchors; pumps still going; sugar washing out very fast; at 10 A.M. (20th) wind more moderate; set close-reefed fore-topsail; wind ESE to E; noon, dark cloudy weather; wore ship to southward; noon, latitude account 35° 20′, longitude 75° 20′ W.
A.M.	E to SE			
	ESE to E			

CHAP. V.

Extract from the Log of the Barque PENELOPE—*continued.*

	Hour.	Wind.	Bar.	Ther.	Remarks.
Third storm.					August 21, 1837. August 21—(20 *Civil Time*).
	P.M.	E S E			Strong gales and cloudy; at 2 P.M. got the ship pumped out to twelve inches, when the larboard pump choked again; at 4 P.M. wind E S E; wore ship to N E, not laying to well; at 9 A.M. gale increasing, and, the wind having veered to the N N W, a very heavy sea running, and the ship getting top-heavy from the quantity of sugar washed out, came to a resolution of running before it till the gale abated; at midnight it blew a perfect hurricane from N N W; at 4 A.M. (21st August, mean time) a heavy sea broke on board, and stove the boats on deck; so we were obliged to throw the pieces overboard, likewise everything off the deck, water-casks, stream-anchor, &c.; at 8 A.M. saw a French brig scudding under a foresail, apparently with no accident; at 10 A.M. more moderate, ship making much water; and, one pump being choked, deemed it prudent to get into some port in America; noon, latitude 34° 30′ N, longitude by chronometer 72° 20′ W.
	A.M.	N N W			
Current accelerated.					August 22—(21 *Civil Time*).
	P.M.	S W	broke		At 6 P.M. wind hauled to the S W; made up my mind to gain a port to the northward of Cape Hatteras; found by observation that the *current had increased in velocity during the gale*, and drove the ship considerably to the northward and eastward, eastward of where I expected her to be. Barometer being broke, it was useless. The general appearance of the weather was dark and cloudy, but no lightning. The latitudes and longitudes for the first two days will be very incorrect, as there was little time to attend to anything else but the pumps; but on the 21st they are by observation. On the night of the 20th we had run about eighty miles due S, which would have made the latitude by account, on the 21st, about 33° 20′ N, whereas by observation it was 34° 50′ N, and the longitude 72° 20′ W; the latter part of the hurricane from N N W; during the night it was very dark, and heavy black clouds, though, if I recollect right, the moon was in her last quarter. (Signed) J. H. GRIMES, Commander of the Penelope.
		N N W			

Extract from the Log of the Barque West Indian, Simpson, Master, from Jamaica to London.—In *Civil Time*.

Third storm. Ship West Indian (Simpson)

Hour.	Wind.	Bar.	Ther.	Remarks.	
				August 20.	
P.M.	N	falls		Increasing breezes, and dark gloomy weather; the wind not steady, shifting about from point to point, and dying into a calm, every now and then with heavy drops of rain; at times the marine barometer and sympiesometer fall very little; the weather-glass brushes up for a strong gale at noon; latitude 37° N, longitude 64° W; in all studding-sails, royals, flying jib-gaff-topsail, unrove all the studding-sail gear, and sent the booms of the yards down; during these twenty-four hours the wind has been variable from S W to E; at 2 P.M. passed the brig Constitution, of Rochester, waterlogged and dismasted.	
	S W to E	down			
				August 21.	
A.M.	S to S E	below rain		A.M. Increasing gales, and squally: in top-gallant-sails; a heavy sea from N E; the wind is variable from S to S E, and a heavy sea from that quarter likewise; at 8 A.M. in double reef of the topsails; people employed unbending all small sails, and sending in the flying jib-boom and gear; carpenter unshipping the bulwarks and stowing them below, and battening down and securing all the hatchways; at 10 strong gales; doubly stowed and passed the mainsail, jib, and mizen, and unrove the gear of the mainsail; at noon hard gales, and hazy, with a cross confused sea; barometer and sympiesometer down below rain; latitude by account 38° 23′ N, longitude 62° 40′ W; at 4 P.M. close-reefed the topsails and reefed the foresail; at 6 P.M. hard gales; stowed the foresail and fore-topsail, and passed them to the yards; unrove the foretacks and sheets, and hove the ship to, head to the eastward, wind S; at 10 P.M. blowing quite a hurricane; we are now involved in a white smoke or fog, and the water as white as a sheet; the main-topsail is on the cap, and the sheets eased off a little to ease the sail; at midnight nearly calm.	
P.M.					Lying-to.
	S				Hurricane.
					Nearly calm.
				August 22.	
A.M.	W			At 1 A.M. the wind came away from about W, and if possible it blew harder than ever; at 6 A.M. it is blowing a hurricane; the ship is laying with half the lee main-deck in the water; three men lashed to the lee bilge-pump, and trying the main pump every ten minutes; the boat on the lee side has broke both davits; secured the boat	Hurricane.

CHAP. V.

Third storm.

Ship West Indian.

Extract from the Log of the Barque West Indian—*concluded.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				August 22.
	W			with tackles from the mizenmast; it is blowing so hard now that the sea is smooth at times, and the water is coming over the weather-rail like a waterspout; 8 A.M. the ship is now laying with her lee-rail under water, the ship making more water than usual; pumps constantly going; at noon the gale is now at its height; it is dreadful; you cannot make the people hear what is said, and you can hardly see for the lashing of the rain and sleet; latitude by account 39° 9′ N. longitude 61° 34′ W; at 2 P.M. more moderate; at 4 bore away; set the foresail and fore-topsail. We sailed from Jamaica, August the 1st, and arrived in the Downs on the 11th of September; we had nothing but fine weather before and after the gale. I have made forty-eight passages across the Atlantic Ocean; I have always met with more hurricanes, thunder, squalls, and tempestuous weather within the influence of the Gulf-stream, than I have found either to the northward or southward, and I cannot account for it.
P.M.				(Signed) HENRY SIMPSON.

Ship Ida.

Extract from the Log of the Ship Ida, Tilley, Master.—In *Civil Time.*

Hour	Wind.	Bar.	Ther.	Remarks.
				Tuesday, August 15, 1837.
A.M.	E N E			A.M. Light breezes and cloudy weather; at 5 light airs and variable, with rain, thunder and lightning, wind veering round the compass; the sky at this time had a very curious appearance, streaky, and resembling a waterspout, and sometimes that of a rainbow; this weather continued till 10 o'clock, when it became fine; at noon light breezes and fine, made sail; latitude observed 27° 31′ N. longitude by chronometer 79° 36′ W; thermometer 85°; marine barometer 30.1-10; at 6 tacked ship to the eastward; at midnight light breezes and cloudy weather; tacked to the northward; wind E N E.
P.M.		30.10	85	
	E N E			
				Wednesday, August 16, 1837.
A.M.	N E			A.M. Light breezes and squally weather; at daylight set top-gallant sails; at 9 in top-

Extract from the Log of the Ship IDA—*continued.*

Hour.	Wind.	Bar.	Ther.	Remarks.	
				Wednesday, August 16, 1837.	Hurricane, middle of August. Ship Ida.
P.M.	N N E	29.80 29.20	80	gallant gails; at noon fresh breezes and squally weather; latitude observed 29° 54′ N, longitude 79° 39′ W; thermometer 80°; marine barometer 29.8-10: P.M. strong breezes and squally; in second and third reef of the topsails; sent down the royal yards; at 3 wore ship to the eastward; wind N N E; at midnight strong breezes and cloudy, with a swell from the eastward; marine barometer 29.2-10.	
				Thursday, August 17, 1837.	
A.M. P.M.	N E to E S E N E	29.00 28.50		A.M. Fresh gales and squally weather; at 4 handed the fore-topsail and foresail; at intervals the wind came in gusts, then suddenly dying away, and continued so for four hours; sent down top-gallant-yards and masts on deck; at 8 hove-to under close-reefed main-topsail and main-trysail; at 9 split the main-trysail; at 10 the main-topsail blew from the bolt-rope; at noon blowing a hurricane; marine barometer 29°; no latitude, no longitude; wind N E; head to E S E; laying-to under bare poles; at 8 P.M. shipped a heavy sea, which washed away the caboose and bulwarks on the lee side; at 10 shipped a heavy sea on the weather quarter, which stove in the companion and washed away all the after bulwarks; the lee-quarter-boat was completely blown to pieces by the wind; at midnight blowing a tremendous hurricane, with rain and a heavy mountainous sea; ship labouring heavily, and shipping great quantities of water fore and aft; four feet water in the hold; used every exertion to free the ship without success; marine barometer 28.5-10.	
				Friday, August 18, 1837.	
A.M. P.M.	N E to S W			A.M. Blowing a tremendous hurricane; *the wind veering from* N E *to* S W within last twelve hours, and every sail blown to atoms from the yards and from under the gaskets; all the pumps choked with ballast; the ship was laying over in a most awful state; at 5 P.M. succeeded in getting the ship before the wind, which we expect prevented her from foundering; at 8 found to our great joy the ship made much better weather scudding than laying-to; at midnight found we had run out of the hurricane, but it still blew a very heavy gale; water in the hold increased to six feet; all	Near the centre.

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Hurricane, middle of August. Ship Ida.

Extract from the Log of the Ship IDA—*continued.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				Friday, August 18, 1837.
P.M.	N E to S W			the pumps choked; five men ill with fever, four disabled by accident, the remainder much fagged by long exertions, having nothing to eat but raw meat.
				Saturday, August 19, 1837.
A.M.	W			A.M. Strong gales with a high sea; at daylight all hands employed in lifting the pumps to clear the ballast, but no one could stay in the pump-well to effect it, in consequence of foul air; got one of the bilge-pumps to work, and one of the main-pumps lifted six feet out of its original place, it threw water badly; at noon strong breezes and cloudy weather; hauled our wind and made sail for some port in America; five men ill with fever, four off duty by falls, and the remainder much fagged by long exertion; wind W.
				Sunday, August 20, 1837.
A.M.	West-ward	29.50	65	A.M. Strong breezes and cloudy weather; people all employed at the pumps, but nearly worn out by fatigue and want of rest; at noon ditto weather, seven feet water in the hold, and it still increasing fast; employed at the pumps, which threw but very little water; latitude observed 31° 36′ N, longitude 76° 9′ W; thermometer 65°; marine barometer 29.5-10; some of the people employed getting spars ready for a raft in case the ship should founder during the night; at midnight more moderate, eight feet water in the hold; the wind from the westward all these twenty-four hours.
				Monday, August 21, 1837.
A.M.	S W			A.M. Fresh breezes and cloudy weather; at daylight to our great joy saw a ship to windward, with her mizen-mast and top-gallant-masts cut away; made a signal of distress to her, she bore up and came down on us; at 6 spoke her; she proved to be Citizen, of New York, from New Orleans, bound to Bremen, now to the nearest port she could reach, being in great distress as well as ourselves, making three feet and a half of water per hour; we consulted, and entered into an engagement to stay by each other; at 9 took off the hatches, and began to lighten the ship from between decks, by throwing overboard coffee, rum, and ship stores, and everything that impeded lightening the ship, as we were under great apprehension of the ship capsizing, as we had

Hurricane, middle of August.

Ship Ida. Sugar had dissolved.

Extract from the Log of the Ship IDA—*concluded.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				Monday, August 21, 1837.
A.M.	S W			two tier of sugar washed out of the lower hold; as the pumps proved of little service commenced baleing out the ship with buckets; but as she had ten feet water in the hold, thought our longer exertions would be of little avail: at 8 spoke the Citizen, and informed her commander that we should abandon our ship at daylight; at midnight strong breezes and squally, the ship having so much water in her we could scarcely get her to answer her helm; wind this day S W; latitude 32° 7′ N, longitude 75° 30′ W.
				Tuesday, August 22, 1837.
A.M.	S W			A.M. Light breezes and fine weather; at 4 strong breezes and squally weather; made a signal of distress to the Citizen, and finding all our endeavours in vain to save the ship with our worn-out crew, got the boats ready and made preparations for abandoning her; at 6 the Citizen stood towards us; at 7 we hove-to near each other, out boat and sent part of crew on board; the boat returned three times, when we succeeded in getting all the crew safe on board the Citizen, although it blew very strong, and the ships were obliged to bear up to pick up the boat, as the wind blew so heavy they could not pull to windward; latitude 33° 14′ N, longitude 75° 19′ W. when abandoned; and landed at Philadelphia on the 30th of August. (Signed) JAMES TILLY.

Ship Westbrook.

Extract from the Log of the Ship WESTBROOK, J. Freeman, Commander, from Jamaica to London.—In *Nautical Time.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				August 15, 1837—(14 *Civil Time*).
P.M.	Variable			5 P.M. light air, approaching to calm; midnight, heavy swell from the S E; noon, latitude 31° N, longitude 78° W; wind variable.
				August 16, 1837—(15 *Civil Time*).
P.M.	Variable E S E			1 P.M. light baffling winds; 7 P.M. increasing wind, and looking squally; in

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Extract from the Log of the Ship WESTBROOK—*continued.*

	Hour.	Wind.	Bar.	Ther.	Remarks.
Hurricane, middle of August. Ship Westbrook.		Variable			August 16, 1837—(15 *Civil Time*). small sails; midnight, wind E S E; steady wind and clear; noon, latitude 32° 20′, longitude 76° 43′; wind variable.
	P.M.	N E			August 17, 1837—(16 *Civil Time*). 1 P.M. wind N E; fresh wind, and clear weather, with a S E swell runing; 6 P.M. in top-gallant sail and single-reefed topsails; strong wind, with a very heavy sea from the S E; 8 P.M. a very heavy appearance in the S, with a good deal of lightning; stowed the mainsail; 7 A.M. strong gales, and a very heavy sea, vessel shipping a good deal of water; 9 A.M. in second reef in topsails; noon, strong gales and very heavy squalls, with rain; latitude 32° 47′, longitude 76° 14′.
Stormy in the south.	A.M.				
	P.M.	E by N			August 18, 1837—(17 *Civil Time*). 1 P.M. wind E by N; strong gales and hard squalls with a high cross sea running; midnight, strong gales and squally; 5 A.M. wind E; noon, blowing strong, and no appearance of change, close-reefed the topsails and down royal-yards; no observation.
	A.M.	E			
	P.M.	S E			August 19, 1837—(18 *Civil Time*). 1 P.M. wind S E; strong gales, and a heavy sea running; 3 P.M. stowed the foresail; 8 P.M. stowed the fore-topsail, being split, and hove-to under closed-reefed maintopsail and trysail; midnight, came on to blow a complete hurricane; sea rising very high; vessel labouring heavily, and shipping quantities of water on all sides; noon (19), no appearance of any change.
	A.M.	S E to N N W			August 20, 1837—(*Civil Time*). Wind at S E, until 11 A.M. on the 20th, when it veered to N N W; throughout these twenty-four hours a terrific hurricane; the sea awfully high; vessel labouring as before, and shipping quantities of water on all sides; a heavy sea struck the jib-boom, and carried away the spritsail-yard, jib, and flying jib-boom; the ship pitching so very heavily, we were obliged to cut away the wreck for safety; lost at the same time both jibs, sprung the fore-top-gallant-mast, split the main-trysail; heavy rain throughout; no observation.
	A.M.	N N W			August 21, 1837—(*Civil Time*). Wind N N W; not the least alteration in wind or weather; vessel labouring as

Hurricane, middle of August.

Ship Westbrook.

Extract from the Log of the Ship WESTBROOK—*concluded.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				August 21, 1837—(*Civil Time*). before, and shipping quantities of water on all sides; rain and thunder; midnight, just the same; 4 A.M. more moderate; bore away, and set the foresail and fore-topsail; latitude 34° 58′, longitude 73° 32′; wind W N W.
Noon P.M.	W N W Variable			August 24, 1837—(*Civil Time*). At 1 P.M. wind variable, and a heavy southerly swell; at midnight a heavy easterly swell.

Ship Sheridan.

Extract from the Log-book of the Ship SHERIDAN.

Hour.	Wind.	Bar.	Ther.	Remarks.
				August 21.
A.M.	E by S			At 9 A.M. a fresh breeze, E by S, and thick foggy weather; no observation at noon.
				August 22—(*Nautical Time*).
P.M.				Begins with strong breeze and cloudy weather; wind E by S; course W by N, and a heavy sea; at 2 P.M. rolled away the studding-sail booms, and took in studding-sails; the wind increasing to a gale, at 4 P.M. double-reefed the topsails, and furled the mainsail and spanker; at 7 P.M. the gale increasing, with a tremendous heavy sea, obliged to keep sail on the ship to save the masts; at 8 P.M. a perfect hurricane; parted the topsail and fore-sheets, and split the sails; hauled them up as well as possible, it being impossible for men to go on the yards; the spanker blown out of the gaskets; the ship rolling both leeward and weather boats in, and shipping large quantities of water; throughout the night dreadful weather; at 1 A.M. wind N W by N; course W S W; at 6 A.M. a little more moderate; cut away the fragments of the sails to save the spars; latter part more moderate. Latitude at noon, by observation, 39° 45′.
A.M.	N W by N			

The packet-ship Mediator, Champlin, from London, took the gale August 22nd, from the eastward at 8 P.M., *civil time,* her place at noon being in latitude

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42° 36′, longitude 61° 42′. At midnight the gale was east-north-east; at 4 A.M., on the 23rd, north-east; at 7 A.M. at north; at 8 A.M. the gale abated, being of shorter duration than with the Sheridan, and *having hauled gradually by the north to north-west.*

On the afternoon of the 22nd of August, the barque Barlow, from Liverpool, bound to St. John's, New Brunswick, passed the Mediator, New York packet, whilst that vessel was lying to. On the afternoon of the 20th, at the period the storm was very severe to the south-west of her, the Barlow experienced calms and variable winds. By noon on the 21st, the wind freshed, with the weather cloudy. At 4, in the afternoon of that day, it became *south-easterly.* Increasing in force, and *veering towards east,* it changed first to north, and afterwards by degrees to north-west.

In the Barlow's log-book the wind is marked north at noon on the 22nd, at which time the topsails were close reefed, having previously split a sail. Profiting by the fair wind, this ship ran before it to the westward, and was soon out of the influence of the storm; for by four o'clock on the morning of the 23rd, she had royals set again, with light and variable breezes.

The ships Duke of Manchester and Palambam.

The narrative of Mr. Griffith, Master of the ship Duke of Manchester, tends further to explain the nature of the three first storms. The Duke of Manchester and another vessel, the Palambam, were to the south of the two first hurricanes on Charts V. and VI.; but they were in the heart of the third one, and the Palambam foundered. Her place where last seen by Mr. Griffith is marked on Chart VII., and she was then under a close-reefed topsail, near the centre of the storm.

The black squall mentioned in the narrative was described to me by Mr. Griffith, as the most appalling sight he had ever seen during his life at sea; and he thought it probable, had it passed over his ship, that it would have upset her; but it passed about a quarter of a mile astern.*

The Log-book is printed from the date of the ship Duke of Manchester leaving Jamaica, in order to record the weather experienced beyond the southern limit of the first and second storms. It shows that the trade wind became suspended; and the whole of it deserves to be attentively studied.

Narrative of Mr. Griffith, Master of the Ship the DUKE OF MANCHESTER.

Duke of Manchester's Log.

Hour.	Courses.	Winds.	Remarks.
			July 26, 1837.
P.M.		N E	P.M. Got underweigh, with a light breeze from the N E, with a cloudy unsettled sky, and exceedingly sultry. Midnight. Calms and light breezes of air from all quarters of the compass.
A.M.			A.M. Ditto weather.
			July 27, 1837.
Noon	.....	Northly	Ditto weather; ship's head round the compass. Noon. A light air from northward, and black cloudy sky.
P.M.			P.M. Ditto weather, very sultry. Lucia harbour bearing S E, distance sixteen miles. Midnight. Ditto weather.
			July 28, 1837.
A.M.		N	Light breeze from the northward. Daybreak. Weather more clear; west end of Jamaica bearing S E by E, distance about eight leagues. Noon. Light breeze from the N W, with an exceedingly dark confused sky, the clouds flying in every direction, and atmosphere very sultry and oppressive. Sun obscured from the time of our sailing.
Noon		N W	

See Charts V. and VI.

* See Luke Howard's "Climate of London," vol. ii. p. 151, 2nd edition, for an account of a cloud of similar appearance.

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Narrative of the Ship the DUKE OF MANCHESTER—*continued.*

Duke of Manchester's Log.

Hour.	Courses.	Winds.	Remarks.
			July 28, 1837.
P.M.			2 P.M. Wind veering round the compass, with heavy rain and squalls.
		SSW	5. The appearance of the weather threatening; wind SSW; took in small sails, and single-reefed the topsail.
			8. Heavy rain, thunder, and lightning; inclined to a calm. Midnight. Fresh breeze and cloudy, with small rain.
			July 29, 1837.
A.M.	.....	SSW	A.M. Ditto weather; wind SSW. 10. Weather more clear. Noon. Pleasant weather; got a sight of the sun for the first time since sailing.
Noon			Lat. 19° 10′ N, long. 79° 17′ W.
P.M.			P.M. Light airs and cloudy, sultry weather. Midnight. Ditto weather.
			July 30, 1837.
A.M.		SSW to S	2 A.M. Squally; took in small sails; wind veering from SSW to S.
Noon			8. Clear weather. Noon. Steady breeze. Lat. 19° 14′, long. 80° 26′.
P.M.		WSW	P.M. Ditto weather; wind still the same.
	Southward		8. Light breeze from the WSW; tacked to the southward. Midnight. Light airs and cloudy.
			July 31, 1837.
A.M.	..... Westward	SSW	5 A.M. Steady breeze from the SSW; tacked ship to the westward.
			8. Steady breeze and clear weather.
			11. Made the land (Grand Caymans), bearing SW, distance fifteen miles.
			Lat. (Noon) 19° 21′, long. 80° 57′.
P.M.			P.M. Light breeze and steady. Midnight. Ditto weather.
			August 1, 1837.
A.M.			A.M. Light breeze and clear.
			8. Pleasant weather, but sultry; one sail in sight to the southward. Noon. Ditto weather.
Noon			Lat. 19° 45′, long. 82° 9′.
P.M.		SSW	P.M. Light breeze and fine weather; wind still from the SSW.
		SE S	8. The wind shifted to the SE, with heavy squalls. Midnight. Squally; wind S.
			August 2, 1837.
A.M.		SE	A.M. Weather more settled.
			8. The wind veered to the SE.
Noon			Noon. Pleasant weather. Lat. 20° 25′, long. 83° 12′.
P.M.			P.M. Moderate breeze and pleasant wea-

Narrative of the Ship the Duke of Manchester—*continued.*

Duke of Manchester's Log.

Hour.	Courses.	Winds.	Remarks.
			August 2, 1837.
P.M.		S E	ther. Midnight. Light airs from the S E, inclined to calm; cloudy sultry weather.
			August 3, 1837.
A.M.			A.M. Unsettled weather; took in all small sails.
		S E	2. More moderate; made sail; wind S E.
Noon			Noon. Ditto winds, and very sultry. Lat. 21° 25′, long 83° 58′.
P.M.		E	P.M. Light airs from E. 2. Calm; dark, cloudy, sultry weather; ship's head round the compass. Midnight. Ditto weather.
			August 4, 1837.
A.M.			A.M. Light airs from all points of the compass.
		N E	5. Pleasant breeze from the N E, and clear.
Noon			Noon. Light airs, and hazy sultry weather. Lat. 21° 31′, long. 84° 38′.
		Calm	Midnight. Calm.
P.M.			P.M. Light breeze, and ditto weather. Spoke the Ambassador, from Liverpool, bound to New Orleans, out fifty-six days.
			August 5, 1837.
A.M.	...	Calm	A.M. Calm; the sea as smooth as oil; not the least ripple or flaw of wind; weather sultry. Daylight. Ditto weather; two sail in sight. At 7, lowered the pinnace to board the nearest vessel, which proved to be the Palambam, Capt. Lotherington, who sailed from Jamaica on the same day as myself. We had both experienced the same weather, and agreed exactly as to our opinion thereof, and how it was likely to terminate; we, from the weather we had between Jamaica and the Caymans, concluded that they had had a hurricane in Jamaica.
Noon			Noon. Hazy, and exceedingly oppressive. Lat. 21° 37′, long. 84° 46′.
P.M.			P.M. Ditto weather.
		Southw^d	2. Light airs from the southward. 8. Calms, and cloudy.
		S E	Midnight. Light airs from the S E.
			August 6, 1837.
A.M.	..	South	4 A.M. Ditto weather; wind South.
Noon			Noon. Cape Antonia, bore N by W, distance fourteen miles. Lat. 21° 42′, long. 85° 0′.
P.M.	..	Southw^d	P.M. Strong breeze from the southward, and cloudy weather. Midnight. Squally. Ship Palambam in company.

See Charts V. and VI.

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Duke of Manchester's Log.

Narrative of the Ship the DUKE OF MANCHESTER—*continued.*

Hour.	Courses.	Winds.	Remarks.
			August 7, 1837.
A.M.			A.M. Ditto weather. 6. Increasing breeze
Noon	.....	S E by S	and squally; wind S E by S. Noon. Ditto weather.
			Lat. 23° 48′, long. 84° 56′.
P.M.		S E by E to E by N	P.M. Strong breeze and cloudy, but fine weather; wind veering from S E by E to E by N, latter part squally and variable weather, with a heavy sea from the E N E.
			August 8, 1837.
A.M.		E N E to E S E	A.M. Commences with strong breeze and squally; took in and made sail as necessary; wind variable from E N E to E S E.
	Southward		5. More moderate. 9. Tacked ship to the southward.
			Lat. (Noon) 24° 5′, long. 83° 59′.
P.M.			P.M. Strong breezes and squally, a heavy sea running from the E N E, shipping much water. 6. A very heavy white squall, with thunder and lightning; in small sails, and double-reefed the topsails. 7. More moderate. Midnight. Squally, with lightning and thunder.
			August 9, 1837.
A.M.		E	A.M. Ditto weather; blowing a strong double-reefed-topsail breeze from East, a heavy sea running from that quarter; several vessels in sight. Ship Palambam in company. Noon. Ditto weather.
Noon			Lat. 23° 20′, long. 83° 12′.
P.M.	S E		P.M. Ditto weather. 8. Tacked to the south-eastward. Midnight. More moderate, but cloudy.
			August 10, 1837.
A.M.	..... N N E	E	A.M. Steady breeze from E. 4. Tacked to the N N E. 5. Fine weather; out reefs, and made all possible sail by the wind. 8.
Noon	S E	E N E	Tacked to the S E; wind E N E. Noon. Fresh breeze and cloudy, with a E N E swell.
			Lat. 23° 33′, long. 82° 5′.
P.M.	Northward		P.M. Strong breeze and steady. 5. Tacked to the northward. Midnight. Ditto weather. Palambam in company.
			August 11, 1837.
A.M.		E	A.M. Commences with fine steady breeze and ditto weather; wind E to N N E.
Noon		to E N E	Noon. Ditto weather.
			Lat. 24° 38′, long. 80° 30′.
P.M.		N E	P.M. Increasing breeze and squally. 5. Strong breeze from the N E; double-reefed the topsails. Midnight. More moderate; made all sail.

Narrative of the Ship the DUKE OF MANCHESTER—*continued.*

Hour.	Courses.	Winds.	Remarks.	Duke of Manchester's Log.
			August 12, 1837.	
A.M. Noon			A.M. Fresh breeze and fine weather, but cloudy and sultry. Noon. Ditto. Ship Palambam in company. Lat. 25° 42′, long. 79° 55′.	
P.M.			P.M. Ditto weather. 8. Squally, with much rain; shortened sail. 10. More settled; made sail. Midnight. Cloudy, with passing showers of rain.	
			August 13, 1837.	
A.M. Noon			A.M. Strong breeze and cloudy weather. Noon. Ditto weather. Palambam in company. Lat. 28° 19′, long. 79° 41′.	
P.M.	.....	SSE	P.M. Light breeze from the SSE, and hazy. Midnight. Ditto weather.	
			August 14, 1837.	
A.M. Noon.			A.M. A continuance of light winds and cloudy. Noon. Light airs and calms. Lat. 30° 17′, long. 79° 36′.	
P.M.			P.M. Very sultry weather. Midnight. Light breeze and cloudy.	
			August 15, 1837.	
A.M. Noon.	.....	ESE	A.M. Light airs from the ESE. Noon. Light airs and close oppressive weather. Palambam in company. Lat. 31° 36′, long. 78° 40′.	
P.M.		N E to S E by E	P.M. Light variable winds and hazy. 3. squally, with rain. From 4 to midnight, wind variable, veering from N E to S E by E.	
			August 16, 1837.	
A.M. Noon.		N	A.M. Light variable winds and a cloudy confused sky. 8. A fresh breeze from the North and hazy weather; *a swell from the eastward.* Noon. Increasing breeze and cloudy; head sea also increasing fast. Lat. 32° 39′, long. 77° 30′. Ship Palambam in company.	Third storm approaching. See Chart VII.
P.M.		N E by E to E by N	P.M. Increasing breeze and head sea; took in top-gallant-sails; single-reefed the topsails, and sent down royal-yards; wind veering from N E by E to E by N. 5. Fresh gale; double-reefed the topsails; a very heavy sea running from E N E. 6. Saw the Palambam for the last time, dead to leeward. Midnight. Fresh gales and hazy.	Palambam when last seen.
			August 17, 1837.	
A.M.			A.M. Commences with strong gales and squally, with rain. 2. Close-reefed the topsails; reefed the courses, and stowed the square mainsail and spanker; sent down	

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Third storm.

Narrative of the Ship the DUKE OF MANCHESTER—*continued.*

	Hour.	Courses.	Winds.	Remarks.
				August 17, 1837.
	A.M.			top-gallant-yards, and run in the flying jib-boom. Daybreak. Heavy gales; furled the foresail; a tremendous sea running and breaking on board. 9. Furled the fore and mizen-topsails, and stowed the fore-topmast-staysail. Noon. Blowing a violent gale, with a dangerous cross sea running from N E to S E, breaking on board fore and aft; furled the main-topsail; ship laying-to under a tarpaulin placed in the mizen rigging.
	Noon.			Lat. 31° 59′, long. 77° 2′.
Black squall.	P.M.			1 P.M. Blowing a hurricane; got life-lines passed fore and aft the ship, and athwart, for the security of the crew. A most extraordinary phenomenon presented itself to windward, almost in an instant, resembling a solid black perpendicular wall, about fifteen or twenty degrees above the horizon, and disappeared almost in a moment; then in the same time made its appearance, and in five seconds was broken, and spread as far as the eye could see: from this time to midnight, blowing a most violent hurricane, with a most awful cross sea breaking constantly on board fore and aft, carrying away bulwarks, boats, cook-house, &c., in fact, everything clear with the deck, except stanchions. Seven of the crew unable for duty, having been more or less injured in the gale. Much thunder and lightning, the thunder scarcely heard, although we were struck with the electric fluid; I had three seamen dangerously injured, but sustained no other damage.
				August 18, 1837.
Cross sea.	A.M.			A.M. The hurricane still raging; ship labouring very much, and at times completely under water, with the cross sea breaking on board; found the ship to strain and make much water; all hands lashed at the pumps: what with the violence of the wind, and the se breaking over them, it was impossible to work them. 7. A heavy sea broke on board, carried away the skylights, binnacles, and companion, and filled the cabin with water.
	Noon.	.....	E to E N E	Noon. Ditto weather; wind E to E N E. Sun observed.
				Lat. (by calculation) 32° 34′, long. 76° 17′.
Wore, and followed the storm.	P.M.	.....	S W	P.M. Wind veered round to the S W; a little more moderate; wore the ship to run her before the wind; after running a short time, a heavy sea struck her on the starboard quarter, and she broached-to, blowing

Narrative of the Ship the DUKE OF MANCHESTER—*continued.*

Hour.	Courses.	Winds.	Remarks.	
				Third storm.
P.M.			August 18, 1837. a hurricane at the time; it threw her on her beam-ends, and carried away the lee-quarter gallery; endeavoured to wear the ship, could not get at the fore-topmast-staysail-halliards, they being on the lee side; loosened the fore-sail (a new one) which instantly blew away: the ship at this time filling fast at the gallery, and down the companion and scuttles; cut away the mizen and mainmasts; the ship being on her beam-ends, and having six feet water in the hold, it was some time before she paid off. After getting the ship before the wind, found she would not run: brought her to on the larboard tack, and sent all hands to the pumps. 6. A tremendous high cross sea, breaking on board fore and aft; scuttled the cabin deck to let the water into the hold, and nailed sails over the companion and scuttles, &c. Midnight. Ditto weather; all hands at the pumps; seven of the crew unable for duty.	On beam-ends. Ship falling behind the storm.
A.M. Noon P.M.	..... NE	W SW	August 19, 1837. A.M. Ditto weather; all hands at the pumps; sea as before, but more inclined from the westward, shipping much water over all. Noon. More moderate. Sun observed. Latitude (by dead reckoning) 33° 7′, longitude 75° 37′. P.M. Very heavy gales; wind W; a heavy sea running and breaking in almost every direction, making a complete breach over the ship fore and aft; boatswain and two hands employed securing the head-yards, &c. 6. Wind S W; set the close-reefed fore-topsail, and run the ship to the N E. 8. More moderate; the sea more regular from the westward. Midnight. Got the pumps to suck for the first time; seven of the crew still off duty.	
A.M. Noon P.M.		WSW WSW	August 20, 1837. A.M. A continuance of strong gales from the W S W, with a heavy sea; five of the crew unable for duty. 8. More moderate; let the reefs out of fore-topsail. Noon. Squally, with rain. Sun observed. Lat. (by acct.) 33° 47′, long. (do.) 74° 52′. P.M. Increasing gales; double-reefed the fore-topsail. 2. Heavy gale from the W S W; close-reefed the fore-topsail; a high sea running from the W N W, but irregular, shipping much water. Midnight. More moderate, with constant rain.	

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Third storm.

Narrative of the Ship the DUKE OF MANCHESTER—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			August 21, 1837.
A.M.			A.M. Moderate and fair weather, with a very long high sea, running from the W S W; made all sail on the foremast; ship not making much water. Noon. Spoke the American ship Deucalion, of Boston, from the Havannah, bound to Boston; she had experienced the hurricane, but was at the time more to the southward; the captain informed me (although she was a ship in fine trim, and 800 tons burthen,) that his ship was near going down with them.
Noon			Lat. (Noon) 34° 19′, long. 74° 2′.
P.M.		S W	P.M. Light winds and sultry weather; a very heavy sea running from the W S W; wind S W; crew employed preparing rigging for a jury-mainmast; set a royal on a jury-mizenmast. 8. Light airs and fine weather. Midnight. Ditto weather.
			August 22, 1837.
A.M.	.....	S W	A.M. Light breeze from the S W; all hands employed about getting up the jury-mainmast. 8. Squally, with rain; clewed all the sails down. 9. More moderate; made all sail; set a topsail on the jury-mainmast.
Noon.			Noon. Cloudy, with heavy rain.
			Lat. (d.r.) 34° 9′, long. 74° 24′.
			Sun observed. Four men unable for duty.
P.M.		Variable	P.M. Fresh breeze and cloudy, with rain. 4. More settled and fine; a heavy sea still running from the westward; wind variable.
		N	Midnight. Steady breeze and fine weather; wind N.
			August 23, 1837.
A.M.	.....	Northwd. N to N E	A.M. Steady breeze from the northward. 2. Wind variable from N to N E, with fine weather until noon.
Noon.			Lat. (by observation) 34° 59′, long. 74° 46′.
P.M.		N by E to N E	P.M. Light winds and fair weather; wind veering from N by E to N E. Midnight. Ditto weather.
			August 24, 1837.
A.M.			A.M. Light breeze and fine weather; all possible sail put on the jury-masts. Noon.
Noon.		Variable	Light variable winds and fine weather.
			Lat. 35° 45′, long. 74° 49′.
P.M.		Variable	P.M. Light winds and fine weather; wind variable. Midnight. Cloudy.
			August 25, 1837.
A.M.			A.M. Commences with light airs and fine weather. Noon. Ditto weather.
Noon.			Lat. 36° 25′, long. 74° 12′.

Third storm.

"I have now given you, to the best of my recollection, the particulars of the gale, winds, &c. A compass at the time was useless, and in the midst of it I had none to go by.

"From the 25th to my arrival at New York had variable winds and weather, attended with squalls, but nothing particularly deserving of notice.

"I experienced a hurricane in 1830, off Cape Florida, on the 15th and 16th August: several ships were lost and dismasted. On the 26th same month had another, in latitude 31°, longitude 75°, which came on precisely in the same way as this of 1837: we were dismasted, &c.

(Signed) "JOS. GRIFFITHS."

These are the two storms on Chart II., described in the log-book of the Blanche frigate.

We shall now follow the track of the ship Castries, from the West Indies, and further develop a cause for variable winds. The track of the Castries will be found on Chart VII. By comparing the log-book with the Chart, it will be seen how this ship on the 13th (*civil time*) sailed into the southern portion of the *third* whirlwind storm, which caused her to have a N.W. wind at 6 P.M. But the storm was on that day making progress to the westward. When its centre had passed the meridian of the ship, the west wind would veer towards the south; and as the ship then had a fair wind to run north, we might expect her to advance from the storm's southern half circle, in which the wind blows *west*, into the northern half circle, in which it blows *east*.

Thus the log-book has the wind changing from N.W. to S.W., to S.S.W. to S.S.E., to S.E. to E.S.E., and E. before the return of the N.E. trade wind.

The Castries seems to have passed behind the

CHAP. V. hurricane, experiencing only what seamen call its "tail." It is probable that the storm must have arisen between this place and that where the barque Felicity is marked on the Chart; and it does not appear to have been severe at first.

Ship Castries. From Mr. MONDEL, Commander of the ship Castries, from St. Lucia to Liverpool:

"We left the island of St. Lucia at 6 P.M. on the 11th August, *nautical time* (10th August, *civil time*), with a light northerly wind, passing through between St. Lucia and Martinique; the wind continued light and variable for three succeeding days, but with much lightning.

Third storm. "On the 15th P.M. (14th, *civil time*), wind south-south-west to south-east; very squally, with much thunder, lightning, and rain, and by noon the trade-wind blew steadily at east.

"During the night of the 15th (I speak from memory) the brig Scipio, from Demerara to Dublin, experienced a hurricane, and on the following morning spoke a French ship that had been dismasted in it.

See foot of Chart VII. "I am sorry I cannot give the corresponding latitude and longitude of this vessel (the Scipio). She arrived thirty-six hours after me in Dublin, and I had her log-book, but made no memorandum. We had no swell in this instance, but it was very dark dismal weather, so that even the most experienced saw something to be afraid of; however we escaped.

Fourth storm. "The hurricane of the 25th of August was not preceded by any very particular symptoms of the weather. It blew steadily from the *east-south-east* for the preceding twenty-four hours; and at 4 P.M. on the 25th (24th mean time), we had split an old jib, and bent another with the intention of setting it; a certain proof, up to that hour, that the weather did not look very bad. But as the gale increased the wind veered to the *north*, and the rain came down in torrents, and continued to do so until the following morning, when the gale abated."

Log of the CASTRIES from St. Lucia, as far as latitude 39° 41′, longitude 50° 4′.—Kept in *Nautical Time*.

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 12, 1837.
A.M. 2	5		N E	W S W		Light winds and pleasant weather; Point Ferre, Martinique, N 1 W; all studdingsails set; in all do.; wind from N E with rain.
4	5					
6	4			W		
8	3					
10	..		Calm			
12	2					At sunset much lightning.
P.M. 2	2		N E by N	S W		
4	2					Midnight.
6	3					Out all studdingsails on larboard side.
8	3					
10	3					
12	3			S		Light breezes and clear weather.

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Obs.	Longitude by Chron.
..	..	..	..	..	15° 10′	..	60° 10′		

							August 13, 1837.
2	3		N N E ½ E				Light breezes and clear weather.
4	3	4		S E			
6	3						
8	4		N by W				In all larboard studdingsails; lightning.
10	4			E N E			
12	3						Midnight.
2	2	4	N by W				Slight showers of rain.
4	2		N N W			½	
6	2						
8	3						
10	3						Fair light trade winds.
12	4						

N 9° W	68	66′	10′	16° 16′	16° 26′	11′	60° 21′	..	60° 40′	

									August 14, 1837. (13 at noon, *Civil Time*.)	
2	3		N W 6 W		N N E to N 1 W				Light unsteady breezes and cloudy; all sail set by the wind.	Castries meeting third storm,
4	2									
6	2	4	W 6 N							
8	4	4	N E 6 E						8. In royals & flying jib.	
10	3								10. Squally with rain.	
12	3	4	E 6 N						Midnight. Wind veered round to the N E; stood on starboard tack.	
2	4		N W ½ W							
4	2		W N W		N					
6	4		N E 6 N		N W				4. Tacked eastward.	
8	4								8. Set foretop-mast and main studdingsails, main-sails, and main-royal.	
10	8									
12	6									
					S W				Set lower and main-top-mast studdingsail.	
17° E	53	52′	15′	17° 18′	..	16′	60° 5′	..	60° 17′	

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and crossing behind its track.

Log of the CASTRIES—*continued.*

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 15, 1837. (14 at noon, *Civil Time.*)
2	7		N N E ½ E	S S W to S S E		Fresh breezes & squally, with a dirty threatening appearance. 4. In all studding-sails; broke the studding-sail boom. 10. In main-top-gallant-sails; much lightning. 11. Set main-top-gallant-sail. Midnight. More settled; set fore-top-gallant-sail and jib.
4	7					
6	7					
8	7					
10	7					
12	7					
2	8			S E		
4	8					
6	7					
8	7					
10	7					
12	7			E S E		Midnight. Heavy squalls, with thunder, lightning, and rain. Fair and cloudy; out main-royal.

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 22° E	171	158′	64′	19° 56′	19° 36′	1° 6′	58° 59′	..	59° 00′

Gale passed and trade wind returned.

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 16, 1837. (15 at noon, *Civil Time.*)
2	7		N by E	E	½	Fresh breezes and cloudy; all sail set by the wind.
4	7					
6	6		N			
8	6					Settled; out fore-topmast and main studding-sail and flying jib.
10	6		N by W	E N E		
12	7					
2	6					Midnight.
4	6					
6	4		N W ½ N			Cloudy weather.
8	5					Showery.
10	4					Employed varnishing the poop, &c. &c.
12	3					

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 17° W	131	25′	37′	21° 41′	..	40′	59° 39′	..	59 54

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 17, 1837.
2	5		N N W	N E ½ E	½	Moderate breezes and pleasant weather.
4	5					
6	5					
8	5		N by W	N E by E		
10	5		N W			
12	5					Midnight. Cloudy.
2	4		N by W ½ W			Squally, with rain.
4	5					
6	5		N by E			
8	6					Increasing breezes and cloudy.
10	6		N N E	E S E		
12	7					

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 15° W	119	115′	31′	23° 36′	23° 27	34	60° 13′	60° 0′	..

Log of the CASTRIES—*continued*.

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 18, 1837.
2	6		NNE	E by S		Fine breezes and clear; all sail set by the wind.
4	6					
6	6					Set lower-main-top and top-gallant-studding-sail.
8	6		N			
10	6	4	N by E ½ E	E by S		Squally, with rain.
12	7					Midnight.
2	7		NNE			Light showers.
4	7					
6	7					
8	6		N by E			Fair and warm.
10	5					
12	4					

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 7° E	135	134′	17′	28° 41′	..	19′	59° 54′	59° 54′	..

									August 19, 1837.
2	4		N		E by N				Light winds and fine weather.
4	4								
6	3								
8	3		NNW						
10	4								Midnight, clear weather.
12	4								
2	4		NW by N						
4	4		NNW						
6	4		NW						Light winds and fine weather.
8	4								
10	4								
12	3								

N 25° W	96	87′	40′	27° 6′	28° 54′	44′	60° 38′	60° 40′	..

									August 20, 1837.
2	3		NW by N		NE by N				Light breezes and pleasant weather.
4	3								
6	3								
8	3								
10	4		NNW						Midnight.
12	4								Increasing breezes and cloudy.
2	4		N by W						
4	4								
6	4								Out main-top and top-gallant-studding-sail.
8	4								
10	3		ENE						
12	3								

N 20° W	77	72′	27′	28° 6′	28° 3′	30′	61° 8′	61° 12′	..

Castries now sailing on the eastward of the third storm.

See Chart VII.

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Log of the CASTRIES—*continued.*

Hour.	K.	F.	Courses.	Winds.	L.W.	Remarks on board.
						August 21, 1837.
2	2		N by E	E	¼	Light airs and very warm weather; thermometer at sunset 87½°.
4	2					
6	2		N N W			
8	2		N			
10	2					
12	3					Light airs; midnight.
2	3		N E by N			
4	4					
6	4					Increasing; set lower studding-sail.
8	4					
10	3	4		S		
12	3					Light breezes.

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 14° E	62	60′	59′	29° 3′	29° 3′	17′	60° 51′	60° 48′	..

							August 22, 1837.
2	3			S S W			Light winds and fine weather; out larboard studding-sail.
4	3		N E ½ N				
6	3			S W			Midnight.
8	3						Pleasant breezes.
10	4						
12	5						
2	6		Chron. fast	2ʰ 42ᵐ 20ˢ			
4	5						
6	4						Light winds and clear.
8	4						At 8ʰ 38ᵐ long. per sun and moon .. 59.49¼.
10	4			S			
12	4						Per chron. .. 59.44¼.
N 33° E	104	87′	56′	30° 30′	30° 31′	1° 5′	59° 46′	59° 36′	59° 41′

									August 23, 1837.
2	3		N E by N	S S E					Moderate breezes and pleasant.
4	3								
6	4								
8	5	4							Midnight. Increasing breezes and clear.
10	5			S E by N					
12	6								
2	6								Cloudy.
4	6								
6	6								
8	6								
10	6								A high westerly swell.
12	6								
N 28° E	120	110′	59′	32° 14′	30° 21′	1° 9′	58° 37′	58° 40′	58° 45′

Swell probably from the third storm.

Log of the CASTRIES—*continued.*

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 24, 1837.
2	6		NNE	ESE		Moderate breezes and hazy; all staysails set.
4	6					
6	6		NE by N			In flying-jib and lower staysails.
8	7					
10	7					In main-top-gallant main-staysails and fore-royal.
12	7					
2	8					
4	9					Midnight.
6	8		NE 1 E		½	Fresh breezes and cloudy.
8	8		¼ N			Ditto ditto.
10	8		NNE			Strong winds; in flying-jib and gaff-topsail.
12	8					

Course.	Dis.	Dif Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 18° E	178	167′	54′	35° 1′	35° 46′	1° 4′	57° 33′	57° 45′	..

Hour.	K.	F.	Courses.	Winds.	L. W.	Remarks on board.
						August 25, 1837.
2	7	4	NNE	E by S		Strong winds and cloudy. 3. In top-gallant-sails; increasing gales; double-reefed both topsails. 4. Furled both courses; split the jib; bent another. 6. Close-reefed both topsails; blowing a hard gale, with heavy rain. 9. Fore-topsail sheet broke, and split the sail; furled it. 11. Blowing a hurricane; blew the main-topsail out of the ropes; got a boat-sail bent to the gaff, and another in the main rigging; the ship keeps-to well; shipping much water over the lee-rail; pumps carefully attended to; washed most of the larboard bulwarks away. As the wind veered N to N E and to N W the vessel was continually with the sea, on or abaft the beam, which caused her to labour tremendously, and I am afraid has thrown some of the puncheons of molasses out of their berths, as the water is very much discoloured, and we can hear some of the casks rolling about.
4	5					
6	3		N ½ E	E by N	½	
8	1	4			2	
10	1	4	NNW	NE		
12	1	4	(Midnight)	NNE	5	
2	1	4		N		
4	1	4	SW	WNW		
6	1	4		NW		
8	1	4				
10	5		ENE			
12	5					

Course.	Dis.	Dif Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 10° W	41	40′	7′	35° 37′	..	9′	57° 42′	57° 54′	..

Fourth storm, overtaking Castries,

and

passing over her.

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Fourth storm.

Log of the CASTRIES—*concluded.*

Hour.	K.	F.	Courses.	Winds.	L.W.	Remarks on board.
						August 26, 1837.
2	5	4	N E by E	W N W		Strong winds with a high cross sea.
4	6	4				
6	6	4				Set jib, mainsail, and main-top-gallant-sail.
8	7	4	N E by ½ E	N W		
10	8					Set fore-top-gallant-sail and gaff-topsail.
12	8					
2	8					Sea more regular; out topmast-studding-sails.
4	8					
6	8					Strong breezes and cloudy.
8	8					Rain and lightning.
10	8		E N E			Fair and strong breezes; carried away fore-top-gallant-mast, sent it down; in top main-staysail.
12	8					

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 53° E	180	108′	144′	37° 25′	37° 9′	2° 58′	54° 44′	54° 56′	..

Hour.	K.	F.	Courses.	Winds.	L.W.	Remarks on board.
						August 27, 1837.
2	8		E N E	N W	½	Strong breezes & cloudy; carrying moderate sail, the rigging being much stretched and very loose.
4	8					
6	8					
8	8					
10	8					
12	7					Clear weather.
2	7					
4	7					Squally, with rain.
6	7					
8	7					Set main-top-gallant-sail and spanker.
10	7					
12	7					Set fore-top-gallant-sail.

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 63° E	176	80′	156′	38° 29′	38° 25′	3° 10′	51° 34′	52° 26′	..

Hour.	K.	F.	Courses.	Winds.	L.W.	Remarks on board.
						August 28, 1837.
2	6	4	N E by E ½ E	N W		Fresh breezes & squally; out lower and main-top-mast studding-sails.
4	5					
6	4					
8	4					Pleasant breezes and cloudy.
10	6					
12	6	4				
2	5			W		
4	4					
6	4					
8	3	4				
10	4					
12	5			S W		

Course.	Dis.	Dif. Lat.	Departure.	Lat. by Acct.	Lat. by Obs.	Diff. Long.	Long. by Acct.	Longitude by Chron.	Longitude by Obs.
N 50° E	115	4′	88′	39° 39′	39° 41′	113′	49° 41′	50° 4′	..

Further remarks relative to the Castries, on the 24th and 25th August, 1837:

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"The hurricane commenced with the wind at east by south, and veered to the north-east as it increased. At 11 P.M. the hurricane blew from the north-north-east, *and veered about two points per hour* until 4.30 A.M. when it partially abated.

Rate of veering.

"We had a sudden *lull* whilst reefing topsails (at 4 P.M. on the 24th, by *civil time*).

Lull.

"Had a high westerly swell for two days previous; but as this is very frequently the case about the termination of the trade winds, *I know not whether to ascribe it to the coming of this hurricane or to some preceding gale.*

Swell.

"Before the storm it was very dark and hazy, with much lightning in the evenings.

(Signed) "J. MONDEL."

By the log of the Castries, it will be seen that after the 14th of August, at noon (by *civil reckoning*), that vessel had fine weather and the usual trade winds until the 22nd, notwithstanding the third storm that was raging not very far off to the westward. About this period, however, a heavy swell was felt from the westward for two days; and there had been lightning in the evenings.

On the 23rd it became hazy, and a breeze from east-south-east freshened to a gale. This was not the great storm which had passed onwards on its course, and which on the 23rd had reached the place of the ship Wanstead. This other gale being a fair wind for the Castries, that ship was carried along with it, until past noon on the 24th (*civil reckoning*). Although not entered on the log, the master states, that there was a sudden lull whilst close-reefing topsails, indicative of being in the centre of a rotatory storm; and the log shows how rapidly the wind was veering, and how violently it was blowing just about this period.

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The Castries had to lie-to until noon on the 25th, when she was enabled to bear away again for England.

On the principle followed throughout, of giving as much information as could be procured relative to each storm, the following extracts are added.

Ship Victoria.

"The Victoria, Dunn, from Lunenburg to Dominica, was upset and dismasted in a hurricane, on the 24th of August, 1837, in lat. 33°, long. 58°, and abandoned on the 12th September."—*From the Shipping Gazette.*

Barque Clydesdale.

"The barque Clydesdale, from Barbados and Antigua, encountered a severe hurricane ten miles north of Barbados, on the 26th of July, 1837. On the 24th of August encountered a hurricane more severe than the former, in lat. 32° 30′, long. 59° 30′, in which the vessel was hove on her beam ends, and remained in that position for two hours. She righted after the whole of her top-gallant-masts and rigging had been cut away."—*Ibid.*

Extract from the protest of the Clydesdale:—

"On the 23rd August, 1837, lat. 30° 21′, about noon, it came on to blow fresh breezes from the east-south-east, accompanied with a heavy confused swell. At 4 P.M. sent down main-royal yard, and at midnight atmosphere dark, and wind *south-east*. Cloose-reefed at 5 A.M. on the 24th; took in all sail; at noon blew a complete hurricane; ship lying over very low, sea washing over; at 4 P.M. top-gallant-masts and yards cut away to save the vessel; at midnight gale moderated. At 4 A.M. of the 25th kept away; at 8 moderate, but still a confused swell.

The third storm had passed over the same part of the ocean on the 22nd of August, where the Castries was lying-to on the 24th and 25th, at which last date the greater storm was beyond the place of the Wanstead. Here, therefore, we have another instance of an explanation of the variable winds: for the great storm would cause a *westerly* gale on the 22nd, over the same part of the ocean, where the smaller storm, coming from

Variable wind.

the south-westward (and bringing up the Castries along with it in the right hand semicircle), *changed the wind to east.*

Bermuda lies between the courses of the two storms marked on Chart VII. By comparing the projections on this Chart with the following extract from a Register kept by Captain Page, of the Royal Engineers, at Bermuda, and given to me there, in 1839, further views connected with the causes for the variable winds will be suggested; for the greater storm on the 21st of August, 1837, caused the wind at the Bermudas to blow hard, with squalls, from the *south-west;* and as it advanced in its course, the wind became *west.*

On the 24th of August the lesser storm, though it did not reach Bermuda, changed the wind to *north;* whilst a very heavy sea *from the east* rolled against the eastern end of the islands, so remarkable as to be spoken of to me two years after, as matter of great curiosity at the time of its occurrence, because of the north wind blowing lightly.

Extracts from Register of Weather, kept in St. George's, Bermuda.

1837. Aug.	Barom.	Ther.	Winds.	Wind's Force.	Weather.
21st	30.000 29.950	83.5 79.0	S W	7	Hazy dense cum. clouds; squalls with rain; lightning at night.
22nd	30.032	83.0 78.5	S W	4.1	Showers; lightning in S E and E.
23rd	30.062	84.0 79.0	S W and W	2.0	Fine; passing clouds.
24th	29.962	83.0 78.5	N	2.0	Fine; cumul. clouds; *a remarkably heavy swell of the sea; a tremendous surf breaking on the rocks; quite remarkable and unusual.* Mean of tide +5".0 above the mean, resulting from a series of observations.
25th	30.205	80.0 75.5	N or calm.	2.0	Fine; air very dry; Dew Point from 12° to 15° below mean temperature.

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"And in the monthly summary of Observations it is thus stated :—'The weather has been fine, serene, and very dry; the winds moderate and variable, amounting in force to a gale, in a part of one day only; although, from accounts received, there has been a succession of severe gales or hurricanes, both north and south of these islands, and at no great distance.'

(Signed) "GEO. C. PAGE,
"Capt. Royal Eng."

Fifth storm, 1837.

Bremen brig.

By referring to the narrative of Mr. Barclay, at page 89, it will be seen that on the 3rd of September he unexpectedly found a Bremen brig, which had sailed from Mantanzas, in Cuba, on the 18th August, up with and alongside of him. This brig had come up by having had strong westerly winds all her voyage. The *fifth storm*, above alluded to, explains the cause of this, for the Bremen brig appears to have been just within the influence of the southern portion of it.

I have traced this gale back to Apolachicola and St. Mark, in the State of Alabama. From thence it crossed over Florida, and entered upon the Atlantic, where the Calypso under her jury-masts met it, and had to anchor 30 miles to the southward of Cape Fear. Although the storm came from the *south-west*, the Calypso had the wind first from the *eastward*. "During the night it increased, but fortunately backed into the *northward* (which was off the land), and at noon on the following day blew a very heavy gale of wind, and continued until the morning of the 2nd, when it backed to the *west-north-west*, and moderated." See page 81).

The Calypso meets the fifth storm.

The following are the published reports relative to this storm:

Apolachicola.

"APOLACHICOLA, Sept. 1, 1837.—I write from the midst of ruins. A hurricane yesterday swept our town and half destroyed

Fifth storm.

it. Nearly every house is unroofed; a number of the upper stories are blown down, and many houses levelled. The storm commenced on the afternoon of 30th August, but was not severe until 4 A.M. on the morning of the 31st, when it became very violent until 7 P.M. The wind was from the *south-east* to *north*." —*Extract of a Letter published in the American Newspapers.*

"The terrible tempest which visited Apolachicola completely destroyed the town of St. Mark. The lighthouse was almost the only building left standing, yet the town of St. Joseph suffered very little in the gale."—*From the American Newspaper.*

St. Mark.

"There has been a severe storm at St. Mark, which commenced about sunrise on the morning of the 31st August, 1837, the wind being from *north-east*. At 8 A.M. the wind was north, and it had increased in violence: only one wharf has been left standing. At the lighthouse the sea rose eight feet higher than usual. *At Pensacola there was no wind.* The schooner Lady Washington was *becalmed* at the same time at Key West. The wind was off shore at the time of the storm, which makes it difficult to account for the high tide; but it is supposed *whilst the north-east wind was blowing on shore, a south-easter prevailed at sea. This is frequently the case, and invariably produces a high tide.*"—*New York General Advertiser.*

Georgia.

"Another storm commenced about the middle of last night, and at 10 A.M. this morning was blowing with some violence from the *north-west*. It continued with somewhat increased violence until noon, when the wind veered to about *west*. It is now 2 o'clock, and still blowing a severe gale."—*From a Savannah Newspaper, Georgian, 31st August,* 1837.

Near Cape Hatteras.

"The ship Florence experienced a heavy hurricane on the 2nd September, 1837, fifty miles east-south-east of Cape Hatteras. It commenced blowing at *east-north-east,* and veered *round the compass.*"—*New York General Advertiser.*

"The Danish brig Maria, on the 2nd September, in lat. 36° 6′, long. 73° 40′, was scudding in a gale from the *south.*

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Fifth storm.

"The brig Stranger, on the 2nd September, from Porto Plato (in St. Domingo) to Philadelphia, experienced a severe gale from *south*, changing suddenly to *north*."

"The wreck of a ship, abandoned and apparently recently dismasted, the sea breaking over her, and articles floating alongside, was passed during a heavy gale of wind, on the 2nd September, lat. 33° north, long. 74° west."

Variable winds.

It is only necessary to prove that the winds are rotatory, and that by some fixed law of nature they revolve uniformly in the same way, and we are enabled to assign a cause for the variable winds. This subject is best studied by beginning at the equator, and following storms towards the poles; for the disturbing causes, although very violent near the equator, seem to occur less frequently, and we can there study the nature of a single isolated storm. But in high latitudes it is very difficult; for the tropical storms seem to be carried onwards towards the poles, whilst other storms are there generated, probably also rotatory; and as the numbers increase, and they seem to expand in size, and the meridians approach each other by the degrees of longitude diminishing, the winds become huddled together in a manner that has hitherto appeared inexplicable. Even admitting the great probability that such is a fixed law of nature, it can only be satisfactorily proved by adducing as many facts in connection with each other as can be collected. As far as my investigations have been carried, all the facts I have met with seem to be in accordance with such a fixed law; and in one of Mr. Redfield's published papers he states, that not one instance of a contradictory kind has come to his knowledge.

H.M.S. Blanche.

See dotted circle, Chart II.

We shall, therefore, return to the latter part of the voyage of H.M.S. Blanche, from the West Indies to Halifax, in August, 1830. By her log-book we find a second gale coming also from the southward, overtaking the frigate on the 24th of August, and becoming a violent hurricane by 10 P.M. on the 25th; and, if we observe the veering of the wind, we find it to be similar to all the other storms described.

This hurricane is mentioned in the 'American Journal of Science,' vols. xx. and xxi.; and it is there stated by Mr. Redfield to have been at Martinique between the 19th and 20th of August; to have passed northerly, and, touching the American shore near Cape Hatteras, raged with great fury at each locality for about forty hours, as it swept the great central curve of their coast; and it passed from thence over St. George's Bank, in a north-east direction. On the American coast it was everywhere a *north-east* storm; but it will be seen by the log of the Blanche that ship had the wind at *south-east*, veering to south-west and to west. The Blanche was on the opposite side of the whirlwind.

I have added, from the same volumes, an interesting narrative of what befell the corvette Kensington, built in America for the Russian Government. That vessel sailed from the Delaware, with fine weather, on the 23rd of August, and, steering south-south-east, met first "a disagreeable head sea," and then the storm on the 25th, without apparently being at all aware of what she was about to encounter.

CHAP. V.

Blanche's Log continued.

Chart II.

Extract from the Log of H.M.S. BLANCHE, Commodore Farquhar, kept by Mr. Middlemist, Master R.N.—In *Civil Time*.

[Continued from Chap. II. p. 12.]

	Hour.	Courses.	Winds.	Remarks, &c. H.M.S. Blanche, August 22, 1830.
	A.M.			
	1	S E by E	N E by E	A.M. Fresh breezes and fine weather.
	2	S E	E N E	1. 30. Squally; up mainsail.
	3	S E by E	N E by E	
	12	S E by E		12. Fresh breezes and fine; wore ship. Wreck Hill, S. 78° E, 213 miles.
	P.M.			
	1	N ½ W	E N E	P.M. Fresh breezes and cloudy.
	8			8. Strong winds and squally weather.
	12			12. Strong gales and squally.
				August 23, 1830.
	A.M.			A.M. Strong gales and squally.
	4	N ½ W	E N E	4. Fresh gales and cloudy.
	8			8. Strong gales, with a heavy sea.
	9. 30			9. 30. Down jury top-gallant-yard.
	11. 20			11. 30. In flying jib-boom.
	12			12. Strong gales and squally, with a heavy sea. Wreck Hill, S 55° E, 231 miles.
Gale commencing.	P.M.			
	1	N by W	E N E	P.M. Hard gales, with heavy squalls.
	4			Ditto weather; down main-staysail.
	6			6. Hard gales and squally weather.
	8	N		Ditto weather.
	10			Most violent gales, with heavy squalls.
				August 24, 1830.
	A.M.			
	1 } 2 }	.....	E N E	A.M. Violent gales, with heavy squalls.
	3 } 4 }	N E by N off N E by E		4. Ditto weather.
	5	N N E		8. Hard gales, with heavy squalls.
	9	N N E by N		Hard gales.
	10	N N E		
	Noon	.....	E	Wreck Hill, S 76° E, 260 miles.
	P.M.			
	1	N E	S E by E	P.M. Hard gales and heavy squalls.
	5 } 6 }	off N E by N up E N E		8. Split main-staysail; unbent it, and bent another.
	7	N E by E		Midnight. Strong gales and cloudy.
	9	E N E		
	11	E by N ½ N		
				August 25, 1830.
	A.M.			
	1	E by N	S E by S	A.M. Strong gales and cloudy.
	3	E		Down main-staysail and set main-trysail.
	4	.....	S by E	4. Hard gales and squally.
Middle of gale.	5	N E by N		4. 30. *Set reefed foresail;* down mizen-trysail to repair.
	11	E N E		9. 30. A heavy sea stove in cabin dead lights and windows; up foresail; hauled to the wind.
				12. Hard gales and heavy squalls. Wreck Hill, S 57° E, 248 miles.

Blanche's Log.

Extract from the Log of H. M. S. BLANCHE—*continued.*

Hour.	Courses.	Winds.	Remarks, &c. H.M.S. Blanche, August 25, 1830.
P.M.			
1	E	S by E	P.M. Hard gales and heavy squalls.
5	N E by E		Ditto weather, with a heavy sea.
7	E N E		Hard gales, with violent squalls.
10	E	S by W	Violent hurricane; fore-staysail blew to pieces.
11	E S E		
12	S E by E		
			August 26, 1830.
A.M.			
1	S E	S W by S	A.M. Strong gales and squally weather.
5	S S E	W	2.30. Set main-staysail; down mizen-trysail.
			Strong gales and squally.
8	S by E		8. Hard gales.
9	S	W by S	9.30. Set fore-staysail; down main-ditto.
12	S by E		Noon. Strong gales and squally.
			Lat. 36° 1′ N, long. 69° 2′ W.
			Wreck Hill, S 46° E, 325 miles.
P.M.			
1	S	W by S	P.M. Hard gales and heavy squalls.
2	N N E		Ditto weather.
7	N W		Ditto ditto; hauled to the wind in consequence of a heavy sea.
8	N W by N		8. Fresh gales and clear.
9	N W		12. Strong gales and squally.
10	N W by W		
11	N N W		
			August 27, 1830.
A.M.			
1	N W by W	W by S	A.M. Strong gales and squally weather.
3			3. More moderate.
4	N N E	W	4. Strong breezes and cloudy weather.
8			8. Strong breezes and cloudy weather; found ensign and several flags damaged.
12			12. Fresh breezes and fine weather.
			Lat. 38° 16′ N, long. 68° 1′ W.
			Sambro Light, N 28° E, 425 miles.
P.M.			
1	N N E	W S W	P.M. Strong breezes and fine weather.
5	.....	W	
6			6. Fresh breezes and fine weather.
12			12. Ditto weather.
			August 28, 1830.
A.M.			
1	N N E	W	A.M. Fresh breezes and fine.
8			8. Light airs and fine.
12			12. Light winds and fine.
			Lat. 41° 21′ N, long. 67° 2′ W.
			Sambro Light, N 36° E, 233 miles.
P.M.			
1	N E by N	N W b W	P.M. Moderate and fine weather.
4	.....	N W	
8			8. Light airs and fine.
12			12. Moderate and fine.

End of gale, followed by westerly winds.

CHAP. V.

Blanche's Log.

Extract from the Log of H. M. S. BLANCHE—*concluded.*

Hour.	Courses.	Winds.	Remarks, &c. H.M.S. Blanche, August 29, 1830.
			August 29, 1830.
A.M. 1	N E by N	N W	A.M. Light airs and fine weather.
8			Observed land, bearing N E by N.
11	.....	N N W	
Noon			Noon. Light breezes and fine. Lat. 43° 10′ N, long. 65° 29′ W. Sambro Light, N 48° 30′ E, 114 miles.
P.M. 1	N E	N W	P.M. Light airs and fine weather.
3	N E by E	W by S	
5			5. Shelbourne lighthouse, N ¾ E.
9	.....	S W b S	
12			12. Light airs and fine weather.
			August 30, 1830.
A.M. 1	.....	S W b W	A.M. Light airs and fine weather.
8	.....	S S W	Ditto weather and foggy; fired a gun for a pilot.
Noon			Noon. Moderate and hazy weather. Lat. 44° 5′ N, long. (none). Sambro Light, N E ½ N, 21 miles.
P.M. 1			P.M. Light airs and fine.
2	.....	S Westly	2. Fired a gun for a pilot.
4			Ditto weather.
Midn.			Midnight. Ditto weather.

Blanche off Halifax.

At Bermuda, on the 21st of August, 1830, the weather was fine, with light airs. On the 22nd there were "stormy heavy showers," the wind changing from N.E. to S.E. On the 23rd and 24th it blew strong, and south-easterly. On the 25th the wind became south and squally; and on the 26th it veered to S.S.W., after which the weather became fine.

Russian corvette Kensington's Log.

Extract from the Log Book of the Russian Ship of War KENSINGTON, Capt. W. W. Ramsay.

Hour.	Courses.	Winds.	Remarks.
			Monday, August 23, 1830.
P.M.	WSW ESE		P.M. Cape Henlopen, bearing W S W. At 7, discharged the pilot, and steered off E S E.
			Tuesday, August 24, 1830.
A.M.	.....	Variable	A.M. Commences with light and variable weather.
P.M.		Southw^ly	P.M. From 4 to 6. Light airs from the southward. 6 to 8. Nearly calm.
A.M.		ENE	A.M. From midnight to 4. Moderate and clear; disagreeable head sea. 4 to 8. Wind fresh from E N E. 8 to meridian. Freshening; took one reef in the fore and main and two in the mizen-topsails.
			Wednesday, August 25, 1830.
A.M.	.....	NE	A.M. Wind high from the N E; took two reefs in the fore and main-topsails.
P.M.		N and E	P.M. From 4 to 6. Fresh gales from the N and E, weather cloudy; sent down royal-yards. 6 to 8. Wind increasing. 7. (40°) close-reefed the topsails, reefed the courses, and furled the mainsail. 8 to midnight. Very squally, with rain. Midnight. Under close-reefed topsails, reefed foresail and fore-staysail; the second gig washed from the larboard davits.
A.M.	Easterly.		A.M. From 4 to 8. Wind not so strong, and hauling to the East.
			Thursday, August 26, 1830.
A.M.	.....	N and E	A.M. Fresh gales from N and E, with heavy head sea; attached an eight-inch hawser to the end of the bowsprit, brought both parts into the hawse-holes, and set them well up; got a pull of the bobstays and bowsprit shrouds.
P.M.			P.M. From 4 to 6. Gale increasing. In sending down top-gallant-yards lost fore-top-gallant-mast and yard. Furled the foresail, fore and mizen-topsails; got preventer-tackles from the foremast to the bowsprit. 6. Andrew M'Cormick was washed from the jib-boom and drowned. 6 to 8. Gale very heavy; the sea increasing to an alarming height. 8 to midnight. Gale most violent; lying to under close-reefed main-topsail and fore-staysail.

Commencing.*

* See the dotted circle on Chart II. The Kensington must have been near the Blanche.

CHAP. V.

Extract from the Log Book of the Russian Ship of War KENSINGTON—*continued.*

Russian corvette Kensington's Log.

Hour.	Courses.	Winds.	Remarks.
			Thursday, August 26, 1837.
A.M.			A.M. From midnight to 4. Gale raging with great violence; a tremendous sea. 1. The main and mizen-top-gallant-masts were blown away close to the caps. 2. A perfect hurricane from the North; taken a-back: the ship in a very critical situation; pitched away the jib-boom, with it the spritsail-yard; sprung the bowsprit and fore and mainmasts; attempted to relieve the ship of the main-topsail, weather sheet parting, the sail was instantly thrashed to pieces. 4. The situation of the ship was most critical, working violently, and much distressed from the weight of her battery. 4.30. Foresail, fore-topsail, and mainsail burst from their gaskets, and were blown into ribbons. 4 to 8. Gale raging with unabated fury; fore-staysail blown from the bolt-rope, and such the force of the storm that not a rag of canvas could be shown. 4.40. Main-topmast went by the cap. 5. Fore and mainmast badly sprung; secured the partner wedges with heavy spikes; to save the foremast and bowsprit cut away the fore-topmast, carrying with it the head of the foremast and part of the fore-top; cock-billed the fore-yard and secured the lee arm to the cable-bitts. 5 30. Carried away weather mainbrace bumpkins; to save the mast, cut away the main-yard, which no human effort could secure: the situation of the ship awful in the extreme, five feet water in the hold, and the crew perfectly paralysed; the wind had now attained a furious height, and the sea increased to such an alarming degree that with great difficulty men could be found to cut away the main-yard.
Middle of gale.		North	
			Friday, August 27, 1830.
P.M.	.....	West	P.M. Gale yet dreadful. 4.30. Wind hauled to West; set the mizen-staysail to keep the ship to. 4 to 8. Gale somewhat abated; set the main-staysail. 6. Gale abating; all hands employed clearing wreck; weather cloudy. From 8 to midnight. Moderate; heavy sea; ship very uneasy.
A.M.			A.M. From midnight to 4. Very heavy sea. 4 to 8. Gale again increasing; spoke ship Norfolk, *from Norfolk*; received an offer of assistance. *The Norfolk was not in the gale.*

The Racer's Storm; and the Winds called Norths.

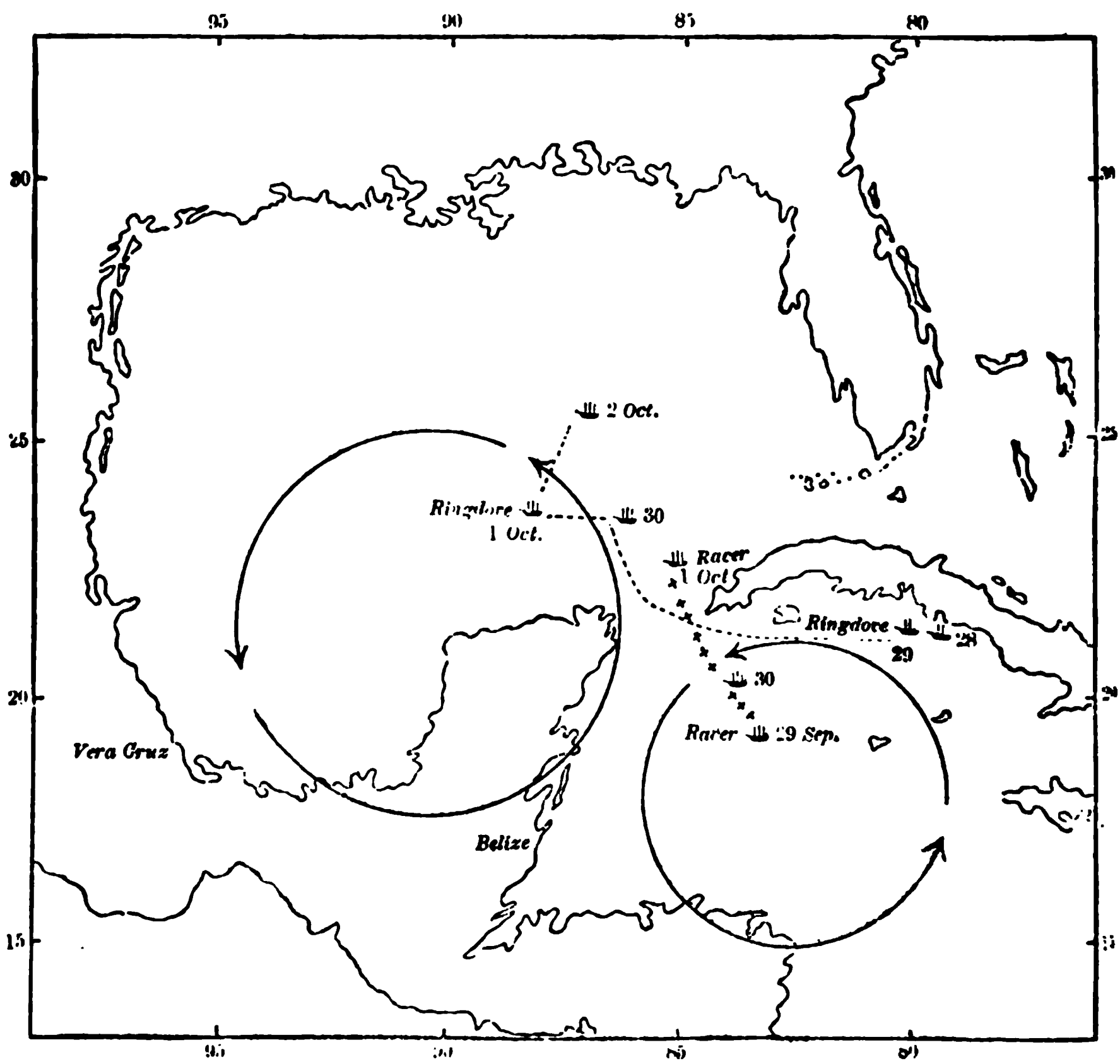
The Racer sloop of war encountered another hurricane on the 28th of September, 1837; H. M. sloop Ringdove being then in the same seas, and within its influence: a comparison of the logs of these two vessels enables us to lay down the probable course of this storm. It may be an instructive one to inquire into, inasmuch as it was moving over Yucatan and towards the Gulf of Mexico; and will serve, along with another storm to be described at the end of Chap. VIII., to explain (at least in some degree) those winds which the Spaniards call *Norths*, and the gales of the eastern shores of Mexico.

By comparing the two log-books and the places of these two vessels, we find the Racer was the most to the southward. She experienced the storm first, and had the wind from E. N. E., whilst the Ringdove, a degree to the northward of her, had the wind more easterly. Both vessels ran with the storm; but the Racer having lost her masts, the Ringdove ran the furthest into the Gulf of Mexico, and therefore longer experienced the storm. It lasted with her until midnight of the 1st of October; whereas it left the dismasted Racer on the morning of that day.

The account of this storm is introduced, in the hope that it will lead to further inquiry into the storms of the Gulf of Mexico, and ultimately to an explanation of the true nature of the winds called *Norths*.

The wind's force in the log of the Racer is recorded

CHAP. V. according to Captain Beaufort's rules; which will be found explained at the end of Chap. X. It is a method so simple and expressive, that it is to be hoped it will be adopted in all records of the weather, both by sea and land.



The paragraph from the 'Jamaica Dispatch,' which follows the Ringdove's log, was only met with after the figure placed above had been engraved; and it shows that the Racer's storm passed over part of Jamaica.

Extract from the Log of H. M. Sloop Racer, James Hope, Esq., Commander; between 1 P.M. of the 28th September, 1837, and 12 A.M. of the 30th September, 1837.

Racer's Log.

H.	K.	F.	Courses.	Winds.	Wind's Force.	Weather.	L. W.	Remarks.
								September 28, 1837.
1	2		S W					P.M. 1.30. Spoke an English schooner from Jamaica.
2	4	5	W S W	E N E	7	O C Q		
3	3		S E by S					2. Spoke an English brig; furled the courses, and trimmed on larboard tack; rove top tackle-falls.
4	2							
5	1	5						
6	1	5						
7	1	5						5. Sent top-gallant-yards on deck; housed top-gallant-masts, and in flying jib-boom.
8	1		S by E		7	Q R W		
9	1		Up S E					
10	1							7.30. Furled the topsails, and set the main try-sail; battened the hatchways down.
11	1		Off S S W		8	U Q R		
12	1							Midnight. Set fore-stay-sail, and wore; down ditto.
								September 29, 1837.
1	1				8	U Q R	6	A.M. 6. A sea washed away life-buoy, stove stern-boat, and carried away starboard-fall-gripes and lashings.
2	1		Up N					
3	1							
4	1			E by N	9	G U R	6	
5	1							
6	1							Cut away ditto.
7	1	5	Off N W					9. Down main-trysail; a heavy sea running; sent top-gallant-masts on deck.
8	1	5						
9	1	5		E N E	10			
10	1	5						
11	1	5						
12	1	5			10	Q U R	6	Noon.

Course.	Distance.	Lat. N.	Longitude W.	Chron.	Bearings and Distance.
S 44° W	36′	D.R. 19° 43′	D.R. 83° 23′	None.	Cape Antonio, N 38° W 156′

1	4	2	N W ½ W	E N E	10	Q U R		P.M. Shaped a course N W ½ W.
2	4	5						3. Sea washed away part of lee hammock-nettings and two upper half-ports.
3	4	5						7.15. In a heavy gust of wind the ship went over on her beam-ends, and lay with her tops in the water for two minutes; when the masts going she righted, with 5½ feet water in the hold.
4	4	4			11			
5	4	4						
6	4	4			11			
7	4	5			12			Found bowsprit gone at the collars; foremast six feet above the deck, mainmast at the hounds; everything on

Shortening sail.

Furled topsails. Battened hatches.

Bare poles.

Ship went over.

Masts went.

CHAP. V.

Racer's Log.

Extract from the Log of H. M. Sloop Racer—*continued*.

H. K.	F.	Courses.	Winds.	Wind's Force.	Weather	L. W.	Remarks.
			ENE		QUR		September 29, 1837. the lower deck hove to leeward; hatches unshipped, and part of the shot and chain cables thrown out of the lockers; bread-room hatch washed away; lee waist-anchor adrift; cut away ditto; battening down hatches afresh, clearing wreck, and pumping ship; at 8.30, the wreck being clear, sent a watch below to clear up lower deck.
8		Drift to the N W 1 mile per hour					
9							9.30. Pumps sucked; ship went over on her beam-ends, but righted immediately, with 2½ feet water in the hold; found sternports stove in, the weather waist-anchor and swinging-boom hove inboard, and lower deck as above; hove overboard two after lee carronades, shot, and all other small deck lumber; pumping ship, securing hatches, and clearing lower deck.
10							
11					OQU		11.10. Departed this life, Charles Gambridge (boy), from injuries received on the lower deck.
12				12			Midnight.
							September 30, 1837.
1				12	OQU		A.M. 3. Got head of main-trysail hoisted twelve feet up the stump of mainmast.
2			ESE				
3							
4							7. Mustered ship's crew, and found missing Henry Langmede (A.B.) and James Martin (capt. forecastle).
5							
6		Drift to the N W 1 mile per hour					
7							
8				11			Found the chronometers full of water, and the main-spring of No. 374 (Arnold) broken.
9							
10							
11							11. Committed the body of Charles Gambridge (boy) to the deep.
12				10	OCR		Noon.

Course	Distance.	Lat. N.	Longitude W.	Chron.	Bearings and Distance.
N 69° W	81′	20° D.R. 12′	84° D.R. 42′	None	Cape Antonio, N 8° W 105′

Racer's Log.

Extract from the Log of H.M. Sloop RACER—*concluded*.

H.	K.	F.	Courses.	Winds.	Wind's Force.	Weather.	L.W.	Remarks.
								September 30, 1837.
1								P M. Employed stowing the boats.
2			Drift to the					
3								3. Got top-gallant-masts lashed as jury-masts and crossed top gallant-yards as lower yards. Set an inner jib as a main-staysail.
4			NW					
5				ESE	10			
6			1 mile per					
7								8 Employed as most requisite, clearing the decks, &c.
8			hour.					
9								
10								
11								
12								
								October 1, 1837.
1	2		NW		9			A.M. Set fore top-gallant-sail and main-trysail. Daylight. Set spendee-jib on bowsprit and main-top-gallant-sail; held a survey on provisions, &c., and hove overboard those spoiled; employed re-stowing starboard sheet-anchor and mounting guns; departed this life, a child—committed the body to the deep.
2	2							
3	2							
4	2							
5	2							
6	2		N	ESE	8	QRO		
7	2							
8	2					C		
9	2	5						
10		5	NNE					
11	2	2		SE by S	7	BC		
12	2							Noon.

Course	Distance.	Lat. N.	Longitude W.	Chron.	Bearings and Distances.
N 21° W	140′	D.R. 22° 22′		85. 36	Cape Antonio, S 51° W 90′

1	2		NNE					P.M. Employed clearing bread-room; drying slops, flags, &c.; set fore and main royal.
2	2			Easterly	6			
3	2							
4	1	5						
5	1	5						
6	1							
7	1							
8	1	5	NNW	N E7	5	BC		
9	1	5						
10	1	5						
11	1	5	N W by N					
12	2							Midnight. Wore.

The Racer and the Ringdove, being both on the north side of the whirlwind storm, had easterly winds.

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Log of the Ringdove.

Extract from the Log of H. M. Sloop Ringdove, John Shepherd, Master.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					September 27, 1837.
1					At anchor off Larza de Fuero.
5				N E	A.M. Fresh breezes & cloudy, with occasional squalls. Daylight, more moderate.
8				E N E	At 8, sent a boat to sound to the eastward.
10				S S E	Standing to the S S E.
11					At 11, weighed & made sail to the S S E. 11.30, observed a strange sail on the lee-bow, altered course to close her. 11.45, shortened sail, wore ship, hove to & boarded the Spanish brig Gurtunedo, 63 days from Barcelona, bound to Trinidad de Cuba.
12					Noon. Fresh breezes and cloudy; bore up and made sail to the S S E; Sugar Loaf Mount N N E, and north point Larza de Feuro, E ½ N. Lat. 21° 23′ N, Long. 79° 54′ W, north end of Larza, E ½ N ten miles.
P.M.					
1	5		S E by S	Easterly	P.M. Moderate and fine, with heavy swell from the eastward.
2	5	4			
3	4	4			
4	3	4	S by E	E S E	At 4, ditto weather; Cayo Breton, E N E 10 or 12 miles.
5	3				5.30, squally, with rain, thunder, and lightning.
6	3	4	N by W		
7	2	4	S E by E	N E	
8	2	6			At 8, moderate & cloudy, with lightning.
9	2	4			
10	2	4			
11	3	6	S by E		
12	2	6	S S E	E	Midnight. Fresh breezes and fine, with heavy swell from the eastward.
A.M.					September 28, 1837.
1	2	4	S E		A.M. Fresh breezes and fine.
2	2	4	S E by E		
3	2	4		Easterly	
4	1 / 1	4 / 0	N ½ E		At 4, fresh breezes and squally.
5	4				
6	5	4			At 6, Cayo Breton, N E by N.
7	5	4	N by W		At 7, strong winds and cloudy; in three reefs.
8	5		N ½ W		At 8, ditto weather.
9	4	6			At 9, observed the high land of Trinidad a-head.
10	4	6			10.30. Bent fore-staysail and trysail; Larza de Feuro on the weather bow.
11	4				
12	4				Noon. Strong breezes and fine. Sugar Loaf Mount, N by E ½ E. Course E, distance, seven miles. Lat. 21° 25′, 21° 23′ N, long. 79° 47′ W 79° 42′. Larza de Feuro, E by N nine or ten miles.

Log of the Ringdove.

Extract from the Log of H. M. Sloop RINGDOVE—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					September 28, 1837.
1	2 2	0 4	N b E ½ E		P.M. Moderate and cloudy, with rain. 1.30, a heavy squall.
2	6	4	W S W	Easterly	2.15. More moderate.
3	5	4	W by S		
4	6				At 4, moderate and cloudy.
5	8				
6	6			E S E	
7	7	6	W S W		
8	6				At 8, fresh breezes and fine, with heavy swell from the eastward; in top-gallant-sails; carried away the long line.
9	8				
10	8				
11	6 2	2 2	....	E	
12	8		S W b W		11.45. Altered course to S W by W.
A.M.					September 29, 1837.
1	7	4	S W b W		A.M. Strong winds and thick weather, with high sea.
2	8	6			
3	9			E	3.30. Up mainsail.
4	9	4			At 4, squally.
5	9				At 5, fresh gales, with high sea; down top-gallant yards and masts, and close reefed the topsails; in jib-boom, and furled the courses.
6	9				6. Altered course to W.
7	8	4	W		
8	8	2			8. Fresh gales and dark gloomy weather, with heavy squalls and rain.
9	8				
10	8				
11	8				
12	7	6			Noon. Fresh gales and heavy squalls, with high sea; ship under close-reefed topsails. Course, S 83° W, distance 179 miles. Lat. 21° 4′ N, long. 82° 56′ W. Cape Corrientes, N 61′ W, distance 96 miles.
P.M.					
1	8		W	E	P.M. Strong gales and heavy squalls; set fore-staysail.
2	9				
3	9				
4	9				At 4, ditto weather, with passing showers of rain.
5	9				
6	9				
7	8	6			
8	8	4			At 8, strong gales and dark gloomy weather, with rain.
9	10				
10	11				At 10, carried away the tack of fore-stay-sail, and split the sail; unbent it to repair.
11	10				
12	11				Midnight. Heavy gales, with hard squalls and high sea.

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Log of the Ringdove.

Extract from the Log of H.M. Sloop RINGDOVE—*continued.*

Hour.	K.	F.	Courses.	Wind.	Remarks.
					September 30, 1837.
A.M.					
1	10		W	E	A.M. Strong gales, with heavy squalls, lightning, and rain. 2. Altered course to W by N. 2.40. Trimmed, and altered course to W N W. 4. Strong gales, with hard squalls and heavy rain. 6. Set fore-staysail and furled fore-topsail; got the jolly-boat in off the quarter to prevent her being washed away, the foremast davit being bent by the sea; found the gig stove during the night by the sea striking her. 8. Heavy gales, with hard squalls; furled main-topsail, set fore and main trysail.
2	10				
3	6	0	W b N		
4	4	2			
5	10				
6	10				
7	10		N W b W		
8	8				
9	8				
10	8				
11	8				
12	8				Noon. Hard gales, with heavy squalls and high sea; ship under trysails and fore staysails. Course, N 71° W, distance 211 miles. Lat. 23° 13′ N, long. 86° 32′ W. Cape Corrientes, S 79° E, distance 121 miles.
P.M.					
1	8		N W b N	E	P.M. Fresh gales and squally, with high sea.
2	8				
3	8				
4	8				4.15. Set main-topsail, and hove ship to.
5	2	4	N by E		
6	2	4			
7	4	4			7.30. Shipped a heavy sea, which stove in four of the weather-ports, and washed away the binnacles.
8	2	4			At 8 strong gales, with hard squalls and high sea.
9	1	4	N N E		
10	1	4			
11	1	4			
12	1	4	NNE ½ E		Midnight. Fresh gales, with hard squalls.
					October 1, 1837.
A.M.					A.M. Strong gales, with heavy squalls.
1	1	4	NE by N	Easterly	
2	1	4	N E		
3	1	4			
4	1	4	NE by N	E by S	At 4 heavy rain, attended with lightning.
5	1	4			
6	1	4			
7	1	4			
8	1	4		E S E	At 8 fresh gales and thick weather, with high sea.
9	1	4			
10	1	4			At 10 gale moderating; set close-reefed main-topsail and fore-trysail.
11	1	4			
12	2	2			Noon. Strong winds and squally; ship under main-topsail, trysails, and fore-staysails. Course, N 35° W, distance 76 miles. Lat. 23° 40′, 23° 16′ N, long. 88° 12′ W, 87° 48′. Fortugo Lighthouse, N 80° E, distance 295 miles.

Log of the Ringdove.

Log of H. M. Sloop RINGDOVE—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					P.M. Fresh gales and squally, with high sea.
1	2		NE by N	E S E	
2	3	6			At 2 a heavy squall; clewed up main-topsail.
3	6		N N E		
4	5				At 4 fresh gales and dark gloomy weather, with heavy passing squalls.
5	5				
6	4	2	NE by N		6. Ditto weather. 6.16. Set main-topsail.
7	2	4			
8	3	4			At 8 ditto weather.
9	4		N N E		At 9 heavy squalls; in main-topsail.
10	3				9.15. Set ditto.
11	3	3			
12	3				Midnight. Fresh gales and thick weather, with passing squalls.
A.M.					October 2, 1837.
1	3	4	N N E	E S E	A.M. Fresh breezes and cloudy sea, gradually going down. Course, N 28° E, distance 99 miles. Lat. 25° 10′, 25° 7′ N, long. 87° 17′ W 87° 22′. Fortugo Lighthouse, S 80° E, distance 237 miles.

"KINGSTON, Sept. 28, 1837.—State of the Weather.—The rains which commenced on Monday Evening last, in Spanish Town, Kingston, and the neighbouring districts, have continued unabated up to the present moment. During the last two days the streets of Kingston were continually inundated, and all business suspended, except in the daily printing offices."—*Jamaica Dispatch.*

See Diagram, page 134, Racer and Ringdove.

"We are sorry to state we were visited during the whole of Tuesday and yesterday with a severe gale of wind, which drove from their moorings three vessels in the harbour. The brig Clorinda, Moore, was driven upon a neighbouring wharf, where the schooner Admiral Colpoys, Darrell, was lying. The concussion took away the cut-water and bowsprit of the latter. The harbour-master directed the scuttling of the Clorinda, to save the adjacent wharves and vessels. The brig Cadwallader dragged her anchor a considerable distance; and the sloop Chatham parted her anchor, and has drifted down as far as Greenwich. Mr. Stewart, the harbour-master, has been in-

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strumental in protecting the shipping, by his decision and exertions."—*Ibid.*

Canada.

The storms detailed in this chapter explain the reason why north east winds bring rain and stormy weather in Canada; and they account for the extraordinary tides which sometimes happen in the river St. Lawrence.

Variable ocean currents.

Here also we have a cause for currents of the ocean being suddenly accelerated, or unexpectedly changing their direction. The effect of diminished atmospheric pressure combined with the action of the wind in creating ocean currents will be noticed further on.

Wreckers.

A far greater number of storms pass over the Gulf of Florida than seem to fall to its regular share, thereby increasing the danger of its navigation, sufficiently imminent from currents, rocks, and shoals. This has given rise to the business of wrecking, followed as an occupation, and in which considerable capital is embarked, on both sides of the Florida stream, by Americans as well as English. The crews are required to take out a licence, that they may be registered and under control.

Necessity for controlling them.

The interests of navigation and of the social world require that a strict control and watch should be maintained over the conduct of inhabitants of islands which border one of the most frequented as well as the most dangerous thoroughfares on the ocean.

Had Mr. Wilkinson and his crew agreed to abandon the Calypso, as he was asked to do, that vessel, in all probability, would have been immediately afterwards taken possession of by the brig, which so shamefully abandoned him at a time when he and his men had

only three-quarters of a puncheon of fresh water amongst fourteen persons, in a hot climate; and when they were reduced to eat raw salt pork, being at the time without masts or sails. Mr. Wilkinson's situation serves to exemplify that of masters of ships when they have to treat with wreckers.

Since the account of the Racer's storm was first published, its further course has been traced by Mr. Redfield across the Southern United States to the Atlantic Ocean, where it became an Atlantic gale, north of the Bermuda islands.

CHAPTER VI.

ON STORMS IN THE SOUTHERN HEMISPHERE.

CHAP. VI. THE storm tracks already traced in north latitude, with few exceptions, are seen to follow nearly similar courses, and in their progress to pass gradually towards the North Pole. While studying the subject, I was led to conclude that, in accordance with the beautiful order and regularity of Nature, storms in south latitude would be found to revolve in a precisely contrary direction to that which they take in the northern hemisphere; I therefore earnestly sought for facts, to ascertain if this were really the case or not.

The first observations I obtained were from Captain Locke Lewis, of the Royal Engineers, who was for several years stationed in the island of Mauritius, between the 20th and 21st degrees of south latitude; and I soon afterwards received others from Captain Grierson, also of the Royal Engineers, who had likewise been stationed at the same island.

On first attempting to lay down these observations of storms in south latitude, by means of the figure used for those of north latitude, they were found only reconcileable with revolving storms, travelling towards the equator instead of towards the pole; but a little inquiry proved that this was not their true course. When the other figure was used, which represents a storm revolving like the hands of a watch (being the second figure

at page 5), then their progress was of course reversed, and tended towards the south pole; and such will be found (as far as I have been able to obtain records) to be their real course and mode of action.

It was not until I had laid down these observations from the Mauritius, and others in south latitude obtained at the India House, that I received from Mr. Redfield, of New York, a copy of the pamphlets written by that gentleman on the subject of storms; and found in those of the latest date a sentence expressive of precisely the same opinion as my own. Mr. Redfield had not then published any detailed proofs in support of it. The following is the sentence alluded to:

"There is reason to believe that the great circuits of wind, of which the trade winds form an integral part, are nearly uniform in the great oceanic basins; and that the courses of these circuits and of the stormy gyrations which they may contain, is, in the southern hemisphere, in a counter direction to those north of the equator, producing a corresponding difference in the general phases of storms and winds in the two hemispheres."

Neither was I aware, when the first edition of this work was printed, that Professor Dove, of Berlin, entertained opinions somewhat analogous, viz., that the winds do revolve, and that in different directions, in the two hemispheres. Professor Dove and Mr. Redfield do not appear to have been known to each other. It therefore strengthens the probability of the correctness of what is here stated, that three individuals should have formed similar opinions on the subject before they had any communication with each other.

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Since the mode of action of the wind in storms can only be satisfactorily ascertained by procuring many simultaneous observations regarding the same storms, recorded at distant points, I proceed to give such details as I have collected from south latitudes. But the number of ships navigating the southern seas is few compared with those sailing on the North Atlantic; it has therefore proved proportionably difficult to procure simultaneous observations of one and the same storm in the southern hemisphere.

Though much less perfect than the observations obtained from north latitude, the facts brought together and arranged in this chapter can hardly fail to interest those who navigate the southern hemisphere. I have printed extracts from the logs in some instances, where I have met with a single ship only in a storm in south latitude, without being able to find a vessel which encountered the same storm at a second point: and though such logs may be of little value in proving by themselves the rotatory nature of storms, yet they may be the means of tracing out other vessels which have encountered the same hurricanes.

I was not aware, when I commenced this inquiry, that it is an observation among seamen, that the storms near the islands of Mauritius and Madagascar generally begin at south-east and end at north-west.

Ships may overtake storms.

This will commonly happen when ships are sailing from the Cape of Good Hope towards India; but on the returning voyage, it would appear as if the ships sometimes overtake the storms, and by sailing faster than they move along, plunge into them from the east side, receiving the wind from the north-west-

north, or north-east. The case of the Neptune, which will be given hereafter, is an instance of what is here supposed to happen.

The most useful observations for our purpose are those made at several islands within the sphere of the same storm; and if the tracks of ships can be added, little more seems required than that such observations should be made and recorded at each place with proper care. In 1824, Captain Locke Lewis, R.E., proposed, that regular observations regarding hurricanes should be kept by the French at the Isle of Bourbon, and by the English in the island of Mauritius, and that duplicates of these observations should be exchanged. This should now be done, and the sphere of observation extended to the island of Rodriguez eastward, and to Madagascar and the coast of Africa westward.

The small vessels which supply Mauritius and Bourbon with cattle, which they bring from Madagascar, although they seldom venture to make the voyage during the hurricane months, sometimes meet with storms; and the reports collected from them by the harbour-masters would be very useful. If such records as are here suggested were kept, the logs of ships which may meet with storms in the same seas would be of great value; and the whole, when put together and compared, would either prove or disprove the rotatory nature of tempests.

It will be seen in this chapter, that the severe storms experienced off the Cape of Good Hope are, in all probability, sometimes the Mauritius hurricanes and Madagascar gales; as the storms off Cape Hatteras are certainly very often no other than the hurricanes

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of the West Indies; and these two capes are in corresponding latitudes in opposite hemispheres.

The barometer.

In this chapter will be found many more perfect observations on the barometer during hurricanes than in any preceding one; and the results they present by the gradual fall of the mercury until the middle of the storm is passed, and its rise until the storm is entirely over, is very striking. This occurs so regularly and so constantly in all the storms we have traced, that it seems of itself almost a proof that storms revolve in circles, and are progressive.

That there are portions of the same latitude within the tropics which are more subject to hurricanes than others, there seems no reason to doubt. The great continents may change the courses of the storms, and they may probably diminish their violence when they do not change their direction. The localities subject to hurricanes are not so limited as has been supposed; and we find them in the Pacific Ocean. In 1837, an American ship, called the Independence, Fisher, master, was in a severe hurricane at Vavaoo, one of the Friendly Islands, latitude 19° south, longitude 173° west. She went on shore; when her masts were cut away; a *shift of wind* took her off again. In 18—, a whaling vessel experienced a severe hurricane at the Navigator's Islands, about latitude 12° south, longitude 160° west; and in this storm two others were lost. The very interesting narrative of Mr. Williams, of the London Missionary Society, giving an account of part of fifteen years' residence in the South Pacific, proves, that in the latitudes where he sailed for so many years in the southern oceans, there are hurricanes exactly corresponding in nature to

those of other similarly situated tropical latitudes. We find for example in his book, allusion made to the breaking of the banana leaves as a measure of the force of the wind when threatening to amount to a hurricane; and this is the common mode of expressing the dread of its approaching strength in the West India islands.

I subjoin a short extract from another part of Mr. Williams's work, to show with what violence the storms of the Pacific Ocean sometimes rage. The hurricane alluded to happened at the island of Rarotonga, one of the groupe called Hervey Islands, situated in latitude 19° south, longitude 160° west, on the 21st and 22nd of December, 1831. The vessel belonging to the missionaries was at the time hauled up on shore to be lengthened. By Mr. Williams's account, it will appear that the ground swell preceded the "coming tempest;" and the sea was raised so high that his vessel was carried some distance inland from the shore. When the east end of their chapel was blown in, we must conclude that the wind was easterly, and it is stated that the gale ended in the west.

Extract from the Rev. Mr. Williams's narrative, giving an account of a hurricane at Rarotonga.

Hurricane in the Pacific Ocean.

"On the morning of December 21, 1831, I received information that a very heavy sea was rolling into the harbour; and if it increased (of which there was every probability) the vessel must sustain damage. I set out for Avarua, and was alarmed on arriving by the threatening appearance of the atmosphere and agitated state of the ocean. I instantly employed natives to carry stones, and raise a sort of breakwater round the vessel. One end of the chain cable was then fastened to the ship, and the other attached to the main post of our large school-house, which stood on a bank ten feet high, forty or fifty yards from the sea; and having removed all the timber and ship's stores to

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what I conceived a place of safety, and taken every precaution to secure my ship and property from the coming tempest, I returned to Ngatangiia. As I was leaving Avarua, I saw a heavy sea rolling in lift the vessel several feet; she fell however gently to her place again. Next day (Sunday) was one of gloom and distress; the wind blew most furiously, and rain descended in torrents from morning to night. We held however our religious services as usual. Towards evening the storm increased; trees were rent and houses began to fall: among the latter was a large shed used as a temporary school-house, which buried my best boat in its ruins.

"About 9 P.M. notice came to me that the sea had risen to an alarming height; that the vessel had been thumping all day on the stones; and that at 6, the roof which covered her was blown down and washed away: to complete the evil tidings, the messenger told us the sea had gone over the bank and reached the school-house, which contained the rigging, coppers, and stores of our vessel; and that if it continued, all our settlement would be endangered.

"As the distance was eight miles, the night terrifically dark, and the rain pouring down like a deluge, I determined to wait till morning.

"Before daylight I set out for Avarua; and in order to avoid walking knee deep in water all the way, and to escape the falling limbs of trees, which were being torn with violence from their trunks, I attempted to take the sea-side path; but the wind and rain were so violent, I found it impossible to make any progress. I was obliged to take the inland road; and by watching opportunities, and running between the falling trees, escaped without injury. Half-way I was met by some of my workmen, who informed me that the sea had risen to a great height, and swept away the store-house and its contents. The vessel was driven in against the bank, upon which she was lifted with every wave, and fell off again when it receded. On reaching the settlement, it presented a scene of fearful desolation: its luxuriant groves, broad pathway, and neat white cottages, were one mass of ruins, among which scarcely a house or tree was standing. The poor women were running wildly with their children, seeking a place of shelter, and the men dragging their property from the ruins of the prostrated houses. . . . . On reaching the chapel, I was rejoiced to see it standing; but as we were passing, a resistless gust burst in the *east* end, and proved the premonitory symptom

of its destruction. The new school-house was lying in ruins by its side; Mr. Buzacott's excellent house, which stood on a stone foundation, was unroofed and rent: the inmates had fled.

"Shortly after my arrival, a heavy sea burst in with devastating vengeance, and tore away the foundation of the chapel, which fell with a frightful crash. The same wave rolled on, till it dashed on Mr. Buzacott's already mutilated house, and laid it prostrate with the ground. The Chief's wife had conducted Mrs. Buzacott to her habitation; but shortly after they reached it the sea dashed against it, and the wind tore off the roof, so that they were obliged to take refuge in the mountains. They waded nearly a mile through water, in some places several feet deep, to reach a temporary shelter, and found that a huge tree had fallen and crushed the hut. Again they pursued their way, and found a hut standing, crowded with women and children taking refuge, where they were however gladly welcomed.

"The rain was still descending in deluging torrents; the angry lightning was darting its fiery streams along the dense black clouds, which shrouded us in their gloom. The thunder, deep and loud, rolled and pealed through the heavens, and the whole island trembled to its very centre as the infuriated billows burst upon its shores. The crisis had arrived—this was the hour of our greatest anxiety; 'but man's extremity is God's opportunity.' Never was this sentence more signally illustrated than at this moment—the wind shifted suddenly a few points *to the west;* which was a signal to the sea to cease its ravages, and retire within its wonted limits. The storm was hushed; the lowering clouds began to disperse; and the sun, as a prisoner, burst forth from his dark dungeon and smiled upon us. * * * * * *

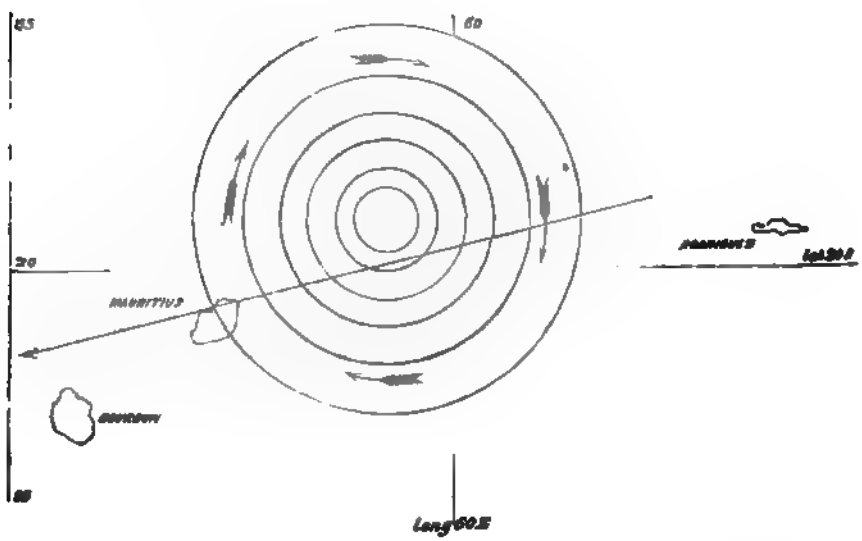
"As soon as possible, I sent a messenger to obtain some information respecting my poor vessel, expecting she had been shivered to a thousand pieces; but, to our astonishment, he returned with the intelligence, that although the bank, the school-house, and the vessel, were all washed away together, the latter had been carried over a swamp, and lodged amongst a grove of large chestnut trees, several hundred yards inland, and yet appeared to have sustained no injury whatever. As soon as practicable I went myself, and was truly gratified at finding that the report was correct, and that the trees had stopped her wild progress; otherwise she would have driven several hundred yards further, and have sunk in a bog."

The first hurricane of which I received any account

CHAP. VI. in south latitude, was that which happened on the 28th of February and 1st of March, 1818, at the Mauritius, when the Magicienne frigate was lying there, moored in the harbour of Port Louis: and on that occasion, this frigate and forty other vessels went on shore, or were sunk; the American brig Jason being the only vessel out of forty-one which rode out the storm.

By a communication from France, I find that this storm was felt at the Isle of Bourbon, though it was not so severe as at the Mauritius; but I have not succeeded in getting either the date when it reached Bourbon, or any account of how the wind blew during the time it lasted.

A figure is here annexed explanatory of its progress over Mauritius.



"Ouragan à Maurice, du 28 Février au soir, au 1 Mars, 1818.

"Les signes auxquel on reconnaît à Maurice l'approche des grandes tempêtes n'ont point annoncé celle-ci. Dans les jours précédens le mercure des baromètres de la ville était descendu

deux fois au dessous de 28 pouces (29·8 English), mais le 28 Février, il avait repris son niveau ordinaire. Seulement dans l'après-midi, le vent se mit à souffler par rafallés variant de l'est-sud-est au sud-est et au sud-sud-est. La force des grains augmenta progressivement jusques à la nuit et cependant peu de personnes conçurent des inquiétudes. Plusieurs fois dans cette saison, des menaces de tempêtes plus caractérisées n'avaient eu aucun résultat fâcheux. Aussi les marins du port, et les habitans des campagnes négligèrent-ils également les précautions que l'on prend d'ordinaire lorsqu'on craint un coup de vent. Peu de navires renforcèrent leurs amarres ; aucun habitant ne songea à couper les tiges des maniocs pour en sauver les racines. La nuit survint et l'ouragan commença ses ravages. La force du vent toujours croissante, et la descente rapide du mercure dans le baromêtre, ne laissèrent plus de doute sur le fléau dont on allait éprouver les terrible effets.

"Jusques au milieu de la nuit les vents soufflèrent du *sud-sud-est, au sud* avec une extréme violence. Vers une heure après minuit, ils commencèrent *a tourner vers l'est;* au point du jour, ils étaient *au nord-nord-est et au nord;* le mercure était descendu à 26 pouces 4 lignes (28·00 English), hauteur réduite à celle du niveau de la mer. Jamais on ne l'avait vu aussi bas. Plusieurs personnes crurent que leurs baromêtres etaient dérangé, celles qui ne pouvaient se méprendre sur la cause de cette dépression, s'attendaient à une grande catastrophe. Heureusement pour la colonie que cet état de l'atmosphère, n'eut qu'une courte durée. En effet on peut juger, par le mal qu'a fait l'ouragan, de celui qu'il aurait produit si sa violence, telle qu elle était, de 4 heures ½ à 6 heures du matin, se fût prolongée de quelques heures. En passant au *nord-ouest*, le vent se calma assez promptement ; le mercure remontà avec toute la rapidité qu'il avait mise à descendre, et dans le journée même du premier Mars, on parvint à communiquer avec la plupart des vaisseaux échoués dans la rade, et l'on put s'occuper de porter quelque remède aux accidens causés par la tempête, à ceux du moins qui en étaient susceptibles.

Wind S.S.E. to S.

East.

N.N.E.

North.

N.W.

"On à observé le lendemain du coup de vent que les eaux avaient partout un goût saumatre. La pluie, pendant sa durée, avait elle-même une saveur très-salée.

"La salle de spectacle est un très-grand édifice. Sa forme est celle d'un T dont la tête est un avant-corps considérable, puisque la partie postérieure, formant la queue du T, a seule 53 pieds de largeur sur 82 de long. Si cet édifice eût été brisé par la tempête on aurait pu attribuer, cet événement à la manière

Effect on buildings.

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dont il était construit: mais, ce qui est à-peine croyable, cet immense arrière-corps de 34 pieds et surmonté d'un comble en charpente, lié en outre avec l'avant-corps qui forme la façade, a cependant chassé de près de cinq pieds sur son soubassement. Quelle force prodigieuse que celle qui a pu produire, le déplacement horizontal d'une telle masse! son renversement eut été un phénomène ordinaire; sa translation, si l'on peut employer ce terme, ne se conçoit pas.

"Toutes les maisons couvertes en bardeaux (*shingles*) et c'est la presque totalité de celles de la colonie, ont été inondées intérieurement par la pluie. On n'imagine point la violence et l'abondance avec laquelle elle est lancée horizontalement pendant nos tempêtes. Alors les couvertures imbriquées sont inutiles et dangereuses même car elles donnent au vent une grande prise, et contribuent à la destruction des édifices. Si l'ouragan eut duré jusques à midi seulement avec la même-force la ville n'eut été qu'un monçeau de ruines. Déjà, au moment où il a cessé beaucoup de belles maisons, intactes en apparence, étaiénts entamées par le toit. Celles qui n'auraient pas été renversées, eussent été emportées pièce à pièce.

Flat roofs.

"Les maisons couvertes en terrasses ou argamasses, à la manière de l'Inde, ont résisté à la tempête, et on y a été à l'abri de la pluie. Mais aucune sorte de couverture n'a mieux soutenu cette épreuve décisive que celle construite suivant le procédé de M. Chaix, c'est-à-dire en briques unies par *un ciment résineux de sa composition.*

Resinous cement.

"Les couvertures en *ardoises* ont été enlevées. La plupart de celles en cuivre et en fer-blanc ont été enlevées aussi, et cependant les toîts de cette dernière sorte ont sur les bardeaux l'avantage inappréciable de ne point donner de gouttières et d'être facile à réparer. Le mal est venu de ce qu'on n'avait pris pas les moyens convenables pour les fixer sur le lattis des combles.

Hurricane houses.

"Autrefois les habitans aisés construisaient une petite maison servant habituellement de dépendance, mais destinée surtout à leur servir de réfuge pendant les coups de vent. Quoiqu'il soit probable qu'un fléau pareil à celui du 1 Mars, ne se reproduira pas de longtemps, on ferait bien de revenir à cette sage précaution. Un petit pavillon en pierre soigneusement bâti, peu élevé sur le sol, et couvert d'un toît plat étroitement lié à la maçonnerie, ne coute pas beaucoup plus, que construit à la manière ordinaire, et il a le double avantage d'une durée indéfinie, et d'être un lieu de sureté, pour les familles lorsque l'ouragan se déclare."

Log of the Magicienne.

Log of H.M.S. MAGICIENNE, commanded by Captain Purvis, R.N. Mauritius, Feb. 28, 1818. This log is in *Civil Time*.

Hour.	Wind.	Bar.	Ther.	Remarks.
				February 28, 1818.
P.M.	SSE			Wind SSE. P.M. fresh breezes and squally; heavy rain at times; at 3 sent party on board the Agile (a detained schooner) to take her lower yards and topmasts, and secure her afresh; observed a chasse-marée upset in the middle of the harbour; sent the barge to her assistance; at 6 a pilot came on board, in consequence of the fall of the barometer, and threatening appearance; at 8 squally; at 12 midnight strong gales, heavy squalls.
	Squally	falls 29.5		
				March 1, 1818.
A.M.	SSE			Wind SSE. A.M. 2.10, strong gales, heavy squalls, and rain, blowing excessively hard; the best bower bent to a mooring-anchor; ship driving slowly; got the spars out of the rigging; SE, at 2.40 a merchant ship drove athwart us, and carried away the jib and flying-jib-boom, with gear; then went clear and upset; at 3 a schooner drove athwart us, remained some time, and then drove on shore; at 4, blowing a complete hurricane, ship still driving; drove on board the Prince Regent, merchant ship; carried away the ensign staff, and cut the stern down to the cabin windows; carried away her jib-boom, and sprung her bowsprit; jolly-boat swamped and went down; the barge went adrift, and stove her broadside in with the Prince Regent's anchor; made fast a cable to the careening hulk; ship aground; heeling very much to port; ESE, at 5 a brig drove athwart us; carried away her mainmast, and went on shore; daylight, hurricane still unabated; observed all the ships in harbour (except the American brig Jason), forty-one in number, were either on shore or sunk; found the main and mizen channels shifted with the violence of the wind, and the hammock-cloths, rails, and boards blown away; at 6 parted the sheet-cable; the hulk parted her mooring-chains, and we drove on shore at the point of the entrance of the fort; NE, ship heeling very much to starboard; sounded round the ship, and found ten feet water from the fore to the main chains, seventeen feet under the stern, and eighteen feet under larboard
	SE			
	ESE			
		28.0		
	NE			

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Log of the Magicienne.

Log of H. M. S. MAGICIENNE—*continued.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				March 1. 1818.
		29.5		bow; at 8 hard gales, with heavy squalls and rain; issued a gill of spirits to ship's company; at 9 more moderate; noon, strong breezes and squally; found as the weather moderates *the water shoaled* fast; under starboard forechains only seven feet, astern fourteen, and on the larboard bow fifteen feet; N E, between 2 and 3 P.M., fresh gales and squally, with rain; at 4 fresh breezes and rainy weather; attempted to heave the ship off by the single bower fast to mooring-anchor; at 4.30 found anchor coming home; E N E, at 7 and 8 fresh breezes and cloudy weather; easterly at 10.30; midnight, moderate, with rain.
P.M.	ENE Easterly			
				March 2, 1818.
A.M.	ESE			Wind E S E at 8 A.M.

Extract from the 'Asiatic Journal':

"The frigate Magicienne, Captain Purvis, is on shore, and many houses in the town are in ruins. On the plantations the buildings have suffered as much as the fields: many planters have lost their all, and the distress is general. The barometer sunk lower than ever was known, and most of those who observed it were unable to account for the notice it gave in so extraordinary a manner.

"It appears that the most violent blast was from the north-east, but with a force very unequal, as we could see small vessels withstand it, whilst others of the greatest strength were destroyed at a small distance from them.

"Many persons observed that the rain water was salt; and, on the day after the storm, the water which flows near the town was found brackish."

The Magicienne suffered greatly, whilst on this station, from the effects of hurricanes; and, by the following extracts from logs kept in the ship (which I received from Capt. Evans, R.N.), she experienced

two storms in 1819, though less severe than those in 1818.

The first one is that which immediately follows; and, like the one of the previous year, began with the with at south-south-east, and ended with the wind about north-west.

Extract from the Log of H.M.S. MAGICIENNE, moored in Port Louis, kept by George Evans, Midshipman.

Log of the Magicienne.

Hour.	Wind.	Bar.	Ther.	Remarks.
				Monday, January 25, 1819.
A.M.	S E			A.M. Moderate breezes, with rain at times.
11	S E by S			11. Strong breezes and squally; down royal and top-gallant-yards, and struck top-gallant-masts.
Noon				Noon. Ditto weather.
P.M. 1.30	S S E			1.30. Got top-gallant-masts on deck; sent a launch to the port-office for cables to secure the ship; the barometer having fallen greatly, struck lower yards and topmasts; run out one 12-inch hawser to an anchor on shore ahead; secured it on board, and secured the other cables afresh.
		29.79	79	
6				At 6 strong gales, with rain; employed securing boats, &c.; several ships in the harbour broke from their moorings; got the awnings down, and jib and spanker-boom in.
6.30				6.30. A brig off Magazine Point parted her stern moorings, and swung alongside our starboard quarter; fast moored her afresh; pointed the yards to the wind. At 2 hoisted the barge in, and hauled second cutter and jolly-boat up on shore; sent a party to secure the Voyageur, and a 12-inch hawser to the Shawfield to secure her; got the top-gallant-yards and skysail-masts out of the rigging.
7	S W ½ W	29.14	76	At 7 strong gales, with heavy squalls.
7.40	S S W	29.10	76¼	7.40. Blowing a perfect hurricane from S S W.
8				At 8 hurricane increasing; saw the flash of a gun to the westward.
8.30	....	29.14	77	
8.40	N W	rising		8.40. The wind shifted to the N W, more moderate; barometer rising; pointed the yards to the wind.
12	....	29.58	77½	12. More moderate.

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Log of the Magiciennne.

Extract from the Log of H. M. S. MAGICIENNE, moored in Port Louis—*continued.*

Hour.	Wind.	Bar.	Ther.	Remarks.
				Tuesday, January 26, 1819.
A.M. 12.30	....	29.62	77½	A.M. 12.30. Strong gales and squally; a hulk astern parted her stern moorings, and swung under our stern.
4	N	29.80	75½	At 4 heavy gales, with rain; at daylight every vessel in the harbour on shore, with the exception of two brigs; one ship on Tonnelieo reef dismasted, and another on shore near her, with her masts standing and signal of distress up; sent an officer on board her; sent a party to moor the hulk astern, and another party to heave the Voyageur off.
8	NNE			At 8 dark cloudy weather, with rain.
9	....	29.80	75½	At 9 sent the lugger St. Jaques out to the Wolfe's Cove on shore off Fort Tonnelieo, to take her cargo out.
10				At 10 squally, with rain at times.
Noon				Noon. Moderate and cloudy.
P.M.				P.M. Moderate breeze and cloudy; got the jib and spanker-booms out, and got the top-gallant-yards and skysail-masts in the rigging; swayed the gaff up; sent the Voyageur with an officer to the Wolfe's Cove to assist in unloading her; hove a brig off Magazine Point; sent a boat to tow the St. Jaques up with part of the Wolfe's Cove's cargo.
Midn.				Midnight. Moderate and fair.

The next extract from the log of the Magicienne describes a third hurricane, which that ship encountered whilst lying in Port Louis Harbour, Mauritius, on the 28th and 29th March, 1819. The centre of this storm would seem to have passed nearly over, or a little to the northward of where the ship was lying; for we find the wind moderating in the middle of the gale, yet veering from the south-south-east, where it commenced, to the north-east, and ending like the two former storms in the north-west. It will likewise be seen how regularly the barometer fell, until the wind began to veer about to the opposite quarter from where the gale commenced.

Log of the Magicienne.

Extract from the Log of H. M. S. MAGICIENNE, moored in Port Louis, kept by George Evans, Master.

Hour.	Wind.	Bar.	Ther.	Remarks.
				Friday, March 26, 1819.
A.M.	E S E			A.M. Moderate and cloudy.
P.M.	E by S			P.M. Ditto.
				Saturday, March 27, 1819.
Midn.	E S E			Midnight. Strong squalls of wind and rain.
A.M.	E by S			A.M. Squally, with rain; received on board the crew of the tender, and gave her to the Liverpool.
	E by S			Midnight. Strong squalls of wind and rain.
				Sunday, March 28, 1819.
1	S E			A.M. Fresh breezes and squally.
4				Came on board a pilot to unmoor the ship; sent a launch a-head to weigh the small bower anchor, but finding the barometer falling, and other indications of bad weather, let it go again.
10.30	.....	29.90	80½	10.30. Heavy squalls of wind; struck top-gallant-masts.
11	S S E			
12	.....	29.77	83½	Strong breezes and squally.
P.M. 1				P.M. Ditto.
2	S S E			Small spars out of the rigging.
3	.....	29.74	82½	3.10 Got top-gallant-masts on deck.
5	.....	29.70	81½	
5.45				5.45. Fresh gales and cloudy; struck lower yards and topmasts; in jib and spanker-rooms; down gaff, and pointed the yards to the wind.
6	S S E	29.70	81	
7	.....	29.70	80	
8	S S E	29.69	80	At 8, strong gales and heavy squalls, with rain.
9	.....	29.66	79½	
10	S S E	29.66	79½	
11	S E by S	29.55	79½	At 11, gale increasing; squalls much more violent; wind veering round to the eastward.
12	.....	29.46	79½	Midnight. Gale increasing violently; expended forty fathom four inches for additional lashing for the cables.
				Monday, March 29, 1819.
A.M. 1	S E by S	29.25	79	A.M. Blowing a hurricane; thick haze and sprays.
2	.....	29.24	78½	
2.18				At 2.18, the ring of the anchor on shore, to which the best bower cable was clinched, gave way, in consequence of which the ship drifted on shore on the larboard bilge, bringing home the small bower anchor and carrying away a 7½ inch hawser; hove in the best bower cable.
3	.....	29.16	77	

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Extract from the Log of H. M. S. MAGICIENNE, moored in Port Louis—*continued.*

Log of the Magicienne.

Hour.	Wind.	Bar.	Ther.	Remarks.
A.M. 3. 19				Monday, March 29, 1819. At 3.19, hurricane more violent; observed H.M.S. Liverpool on shore, a-stern of us, and a number of merchant ships.
4	S	28. 98	77	At 4, more moderate, *wind veering round;* ran out the best bower cable again, and clinched it; ran out the sheet cable on the larboard-quarter, and clinched it.
4. 30	N E			Moderate, wind veering fast. At 4.30, quite moderate, wind veering round fast to N E; ship still aground; carried away the messenger in trying to heave the ship off; rove a purchase on the cable.
5	W N W	28. 98	78	
6	.....	28. 99	78	
7	N W	29. 70		
8	.....	29. 20		At 8, strong gales and squally; carried away the purchase-fall.
9	.....	29. 32		
10	.....	29. 40	79	
12	N W	29. 42	80	Noon. Ditto weather.
P.M. 1				P.M. Strong gales and squally; up lower yards; rove a purchase-fall, and lashed the purchase-blocks afresh; endeavoured to heave the ship off, but finding the tide lowering and the ship fast aground, with but twelve feet water under the lee-main-chains, deferred, and commenced lightening the ship.
2	N			
3	.....	29. 50	80	
7	N N E			
8	.....	29. 71	79½	At 8, moderate, and squally with rain.
12				Midnight. Dark cloudy weather.

The next storm is the hurricane of 23rd February, 1824, at the Mauritius. It appears to have begun with the wind more at east than the three preceding, and seems to have ended with the wind nearly at west: this would indicate a course about south.

By an extract of a letter from the Commandant of the Isle of Bourbon, the same storm does not appear to have visited that island: and the reason will be apparent, on inspecting the figure drawn to explain the Mauritius hurricane of 1824, at page 165.

The registers from three different barometers for this hurricane have been preserved by Captain Locke Lewis; and it will be seen how nearly they agree in the gradual descent before alluded to, during the first part of the hurricane, and the gradual and regular ascent during the latter part of its continuance.

The French extract, which follows Captain Lewis's tables, relates to the manner in which these storms blow in gusts or veins, which seems to be a distinguishing character of hurricanes.

Observations of the State of the Barometers during a Hurricane at the Mauritius, on the 23rd February, 1824.

Hour.	No. 1.	No. 2.	No. 3.	Remarks.
At 7. 0 A.M.	29 75	29.77	29.50	Wind S E; var. to E; strong gales.
8. 0 ,,	,, 75	,, 77	,, 50	Ditto ditto
8.30 ,,	,, 70	,, 73	,, 50	Ditto ditto
9. 0 ,,	,, 70	,, 73	,, 50	Ditto ditto
9.30 ,,	,, 68	,, 70	,, 50	Ditto ditto
10. 0 ,,	,, 68	,, 70	,, 50	Ditto ditto
10.30 ,,	,, 63	,, 68	,, 47	Ditto ditto
11. 0 ,,	,, 63	,, 65	,, 47	Ditto ditto
11.15 ,,	,, 60	,, 62	,, 45	Ditto ditto
11.30 ,,	,, 56	,, 58	,, 40	Ditto ditto
11.45 ,,	,, 56	,, 58	,, 40	Wind shifted to the eastward.
12. 0 ,,	,, 53	,, 56	,, 38	Ditto
12.15 P.M.	,, 49	,, 50	,, 33	Ditto
12.30 ,,	,, 44	,, 48	,, 28	Ditto
12.45 ,,	,, 40	,, 42	,, 25	Ditto
1. 0 ,,	,, 37	,, 40	,, 20	Wind E N E.
1.15 ,,	,, 30	,, 34	,, 18	Ditto
1.30 ,,	,, 29	,, 34	,, 16	Ditto
1.45 ,,	,, 25	,, 28	,, 10	Ditto
2. 0 ,,	,, 20	,, 22	,, 05	Ditto
2.15 ,,	,, 11	,, 13	28.95	Ditto
2.30 ,,	,, 11	,, 13	,, 95	Ditto
2.45 ,,	,, 02	,, 05	,, 88	Ditto
3. 0 ,,	28.97	28.99	,, 80	Ditto
3.15 ,,	,, 85	,, 88	,, 69	Wind N E.
3.30 ,,	,, 75	,, 77	,, 60	Ditto
3.45 ,,	,, 66	,, 69	,, 52	Ditto
4. 0 ,,	,, 58	,, 60	,, 45	Wind N N E.
4.15 ,,	,, 58	,, 60	,, 45	Ditto
4.30 ,,	,, 59	,, 60	,, 46	Wind North.
4.45 ,,	,, 59	,, 60	,, 47	Wind N N W.
5. 0 ,,	,, 59	,, 60	,, 47	Wind N W.
5.15 ,,	,, 62	,, 60	,, 47	Ditto
5.30 ,,	,, 67	,, 60	,, 53	Ditto

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Observations of the State of the Barometers— *continued.*

Hour.	No. 1.	No. 2.	No. 3.	Remarks.
At 5.45 P.M.	28.67	28.60	28.53	Wind N W.
6. 0 ,,	,, 72	,, 71	,, 59	Wind W; gale decreasing.
6.15 ,,	,, 86	,, 83	,, 73	Ditto ditto
6.30 ,,	,, 97	,, 94	,, 80	Ditto ditto
7. 0 ,,	29.09	29.06	,, 90	Wind S W.
7.30 ,,	,, 17	,, 14	29.00	Ditto
8. 0 ,,	,, 28	,, 23	,, 08	Wind S E.
8.30 ,,	,, 33	,, 30	,, 16	Ditto
February 24.				Wind S W.
6. 0 A.M.	,, 67	,, 60	,, 46	Ditto
7. 0 ,,	,, 69	,, 62	,, 49	Dtto
8. 0 ,,	,, 70	,, 66	,, 50	Wind W.

(Signed) THOMAS LOCKE LEWIS,
Captain Royal Engineers.

In the hurricane of the 23rd of February, 1824, at the Mauritius, upwards of thirty vessels were wrecked there.

The following remarks, printed in a Mauritius newspaper, relate to the manner in which the wind appears to blow in veins differing in degrees of strength:

"Il parait qu'une trombe, ou tourbillon (de ceux qui ont fait donner aux ouragans le nom de typhon), a parcouru une ligne sur laquelle se sont trouvées plusieurs maisons du Champ-de-Lort, et particulièrement le College Royal.

"C'est contre ce terrible phénomène, qu'il faut se précautionner dans les ouragans: aussi n'est il pas prudent en pareil cas, de demeurer dans les maisons élevées; dans celles surtout qui sont posées sur de haut soubassemens en pierre formant le rez-de-chaussée. C'est très mal raisonner que de dire, qu'une maison a résisté à tel ouragan ou à tel autre. Elle ne s'est pas trouvée sur le chemin d'un tourbillon, voilà ce qui l'a preservée. Telle est aussi la cause d'un fait observé dans tous les ouragans celui de la préservation d'une maison tombante de vétusté, étroite, élevée, qui n'est pas même ébranlée à peu de distance d'un édifice neuf, qui est renversé ou mis en pièces.

"La météorologie est encore dans son enfance. Tout-ce-que nous savons c'est que, dans ce qu'on appelle les mauvais tems,

la pesanteur des colonnes atmosphériques decroit plus ou moins; mais les proportions entre ce décroissement, et l'action de l'air à la surface de notre planête, demeureront probablement longtemps ignorées. Probablement aussi ce n'est pas nous qui verrons construire l'anénomêtre capable de mesurer la force acquise par l'air, lorsqu'il *réduit en filamens*, et qu'il tord comme un cordage le tronc d'un arbre vigoureux, ou qu'il fait tourner sur sa base une édifice en pierre comme la Maison Laffargue. Aussi les diverses denominations données récemment aux différens dégrés de la tempête, en raison de l'espace que le vent parcourt dans une seconde, nous semblent telles fort insignificantes. C'est le tort de beaucoup de savans. Ils ont la fureur de réduire prématurement en théories certains points des sciences naturelles, sur lesquelles on est entièrement dépourvu de faits suffisamment observés. "J. M."

Copy of a Letter from the Commandant of the Island of Bourbon, to Captain T. Locke Lewis, Royal Engineers, relative to the hurricane of the 23rd of February, 1824:

"Nous avons ressenti à Bourbon, le contre coup de votre tempête. Il est à remarquer, que le 22 Février, nous eûmes aussi des apparences de mauvais tems; qui s'accruerent jusqu'au lendemain, au point de me déterminer, à donner le signal d'appareillage à nos batimens. Mais ces deux jours les vents restèrent à l'est et au sud-est, ils s'appaisèrent dans la journée même du 23. Le lendemain le tems fut magnifique, et se maintient en cet état jusque dans l'après-midi du 25, que le vent s'étant déclaré au nord,a mena des nuages et une simple apparence de pluie. L'indication barométrique, n'était nullement défavorable. Par malheur les batimens étoient revenues sur la rade; dans la nuit la mer devint affreuse, et contribua surtout à en pousser neuf d'entre eux sur la côte. Le vent souffla alternativement du nord et du nord-ouest; mais sans une extrême violence. Le baromêtre etoit descendu alors à per long. 27.7 (or 28.2 inches English)."

There was a severe hurricane at the Mauritius on the 19th and 20th of January, 1834. Captain Grierson, Royal Engineers, who was stationed there at that

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date, has informed me, that the wind scarcely veered at all during the continuance of this storm; and that its general direction was that of the trade wind at the Mauritius, or nearly south-east. Captain Grierson's statement was from memory, having made no record in writing at the time.

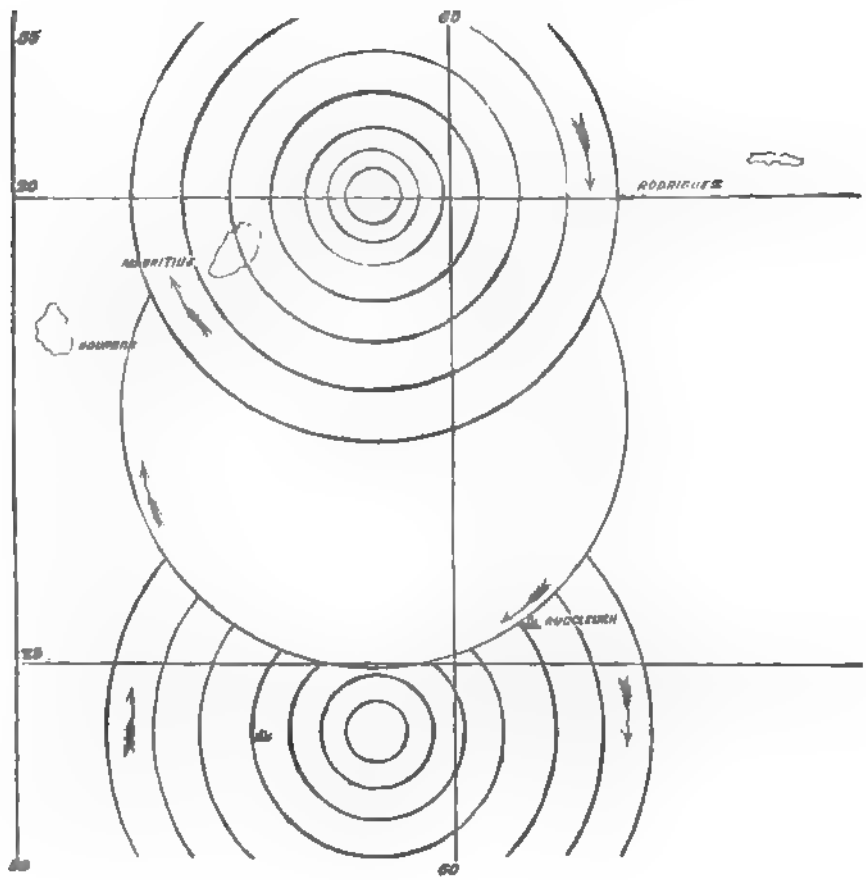
Mr. James Tilley, who was then master of the ship Emma Eugenia, was also there at the time; and he states that the wind was *east*, veering to the *southward*. His ship and seventy-nine other vessels were driven on shore. Mr. Tilley describes the wind as blowing in sudden gusts.

If this storm were a rotatory one, revolving as we suppose those of the southern hemisphere to turn, a portion of its west side only would pass over Mauritius, as represented in a figure hereafter annexed; and it was probably moving on a course nearly south. Had it been moving towards the contrary direction, it would have been carried towards the Seychelles islands; but there it is said hurricanes never happen; and they are probably of rare occurrence so near the equator. During the war it was the practice of our ships to go to these islands for safety during the hurricane months from the Mauritius, as it was the custom in the West Indies to go to Trinidad: thus we find in both hemispheres our ships of war sought to avoid hurricanes by approaching the equator. Yet further on in this inquiry, one great storm will be traced, which seems to have been felt within a degree of the equator.

If the Mauritius storm of the 19th and 20th of January moved southward, this would bring it to the place of the ship Duke of Buccleugh, on the 21st and

22nd of January. By referring to her log, it will be seen this ship was proceeding on her voyage from Calcutta and Madras towards England, when she met a storm on the afternoon of the 21st of January, which has every appearance of being this hurricane. She was then standing on a course W. ½ S., her place at noon being marked in the log; and her place at about 5 P.M. is on the foregoing figure.

At 5 P.M. she had the wind at *east-north-east;* at midnight it had veered to *east by north,* and was increasing, with the weather cloudy. The ship ran in



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the gale until past noon, the wind veering to *east-south-east*, and to *south*. Then the vessel had to be laid-to; and we have again in the log the description of what occurs when a ship is near the centre of a storm. From south the wind veered to *south-south-west*, and next became *south-west;* and at 4 next morning, which was the 23rd of January, when the wind was *west*, the gale began to moderate.

Log of the Duke of Buccleugh.

Extract from the Log of the Ship DUKE OF BUCCLEUGH.

Civil Time.

Hour.	Courses.	Winds.	Remarks.
Noon	W S W	E N E	Tuesday January 21, 1834. Steady breeze and hazy weather. Employed variously under the boatswain; cleaned the lower deck. Noon. Fresh breeze.

Dist. per Log K.	Course and Dist.	Sun's Lat	Long. Chro.	Bar.	Ther.	Symp.	Diff.
..	S 57° W 200′	24° 35′ S	61° 49′ E	30.00	80½	29.60	.40

	W ½ S	E by N	Fresh breeze and hazy weather; all sail set.
		E N E	5. Cloudy; in top gallant-studding-sails, and fore and mizen-royals, and top-gallant-sails.
		E by N	6. In main-topmast-studding-sails. Midnight. Increasing breeze and cloudy weather. In lower and fore-topmast-studding-sails and main-royal.
		E S E	Wednesday, January 22, 1834. Fresh breezes and unsettled weather; furled the fore and main-top-gallant-sails. 4. Increasing; double-reefed the topsails and sent down royal yards; heavy rain. 8. Thick rainy weather and sharp squalls; spar-lashed the long-boat and booms, and battened the hatches down; furled the main-sail. 11. Fresh gale; in third reef fore-topsail, and housed the flying-jib-boom. Noon. The gale increasing, with a high irregular sea on; the ship labouring heavily

Log of the Duke of Buccleugh.

Log of the Duke of Buccleugh—*continued.*

Hour.	Courses.	Winds.	Remarks.
		South	Wednesday, January 22, 1834. and shipping quantities of water; furled the fore-topsail and foresail, and close-reefed the main-topsail, and rounded-to, under the main-topsail, and main-trysail on the *larboard tack.**

Dist. per Log K.	Course and Dist.	Sun's Lat.	Long. Chro.	Bar.	Ther.	Symp.	Diff.
225	S 74° W 243′	25° 39′ S	57° 32′ E	29.76	80°	28.94	.82

P.M.		SSW	P.M. At 30ᵐ past noon, the gale increased to a severe hurricane, and blew in furious gusts *from S S W*, the ship laying over on her beam-ends, labouring heavily, and shipping great quantities of water; broke the main-trysail-gaff, and split the sail to pieces; broke the inner bobstay-chain; got the fish-tackles and preventer-tackles up to secure the foremast and ease the bowsprit; split the main-topsail; a considerable quantity of water came in at the lee lower quarter-gallery, although the slide was shut, and through the lee lower dead-lights; the carpenter employed caulking and securing them; employed baleing water from the lower deck and working the pumps; found a quantity of water rushing in on the lee-bow; loosed the fore-topmast-staysail and lowered the driver gaff; split the sail to pieces to try to wear the ship; split the staysail; loosed the foresail, and split it to ribbons, and afterwards the fore-topsail, which split also; got tarpaulings in the fore-rigging, but the ship lay on her broadside in the trough of the sea, and refused to wear, with her lee-waist full of water,
		SW	the gale blowing furiously from S W, and the sea occasionally making a complete breach over us; stove the lee-quarter cutter; cut her away; cut the lee guns adrift, and threw them overboard, and all the bales of hay from the top of the long-boat to ease the ship; the lee hammock-nettings washed away. At 3, discovered the leak, which proceeded from the lower sill of the upper-deck scuttle under the top-gallant-forecastle having been knocked away; stopped it; cut away all the head-sails, and put tarpaulins in the weather mizen-rigging, to bring the ship again to the wind; employed baleing the lower-deck and working the pumps; found the bilge-water

* See the left-hand vessel marked in the figure, p. 165.

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Log of the Duke of Buccleugh.

Log of the DUKE OF BUCCLEUGH—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Wednesday, January 22, 1834. strongly impregnated with nitre, from the cargo being damaged. The gale blew with great fury until 4 o'clock, when it began to moderate; got hold of the bobstay-chain and set it up with a preventer-tackle; bent the new driver and set it, balance-reefed. 6. The gale abating and the ship easier; continued pumping, and at 8 pumped her dry; fresh gale with a heavy cross sea; ten to eleven inches in the well; pumped her dry. Midnight. Fresh gale and a high sea.
A.M.	Head to the N N W		Thursday, January 23, 1834. A.M. Strong gale: pumped her out every two hours. 4. Moderating; bent best fore-topmast-staysail. 7. Set the close-reefed mizen-topsail. 8. Reefed mainsail and set it; a high sea running; got wreck main-topsail cleared away; bent new one; set it treble-reefed; unbent the remains of foresail and fore-topsail, and bent the new ones, close-reefed fore-topsail, and reefed foresail and set them; observed bowsprit slightly sprung outside the gammoning.

Dist. per Log K.	Course and Dist.	Sun's Lat.	Long. Chro.	Bar.	Ther.	Symp.	Diff.
..	N 32° E 54′	24° 53′ S	58° 4′	29.76	76°	29.43	.33

	Head to the N W and N N W	From S W to W	Wednesday, January 23, 1834. Moderate gale and passing squalls; repaired chain-bobstay with a spare iron skackle and set it up; got the flying jib-boom in; furled mainsail; sent down fore-top-gallant-yard, and housed the mast; sent down mizen-top-gallant-yard; sent down broken main-trysail gaff; pumped when we had about twelve inches water; was used every four hours; strong winds and passing squalls, with a high cross sea.

"It is surprising *that previous* to so severe a gale a greater fall of the barometer had not taken place, having not been lower than 29.76 inches. It may be accounted for, from the wind blowing from the southward. The sympiesometer had been for the last week about .38 decimals lower than the barometer; but

on the morning of the gale it fell .82 decimals lower than the latter; therefore the indications of this sensitive instrument ought to be attended to.*

(Signed) "A. H., Commander."

The following table of Observations was given to me by Col. Lloyd, whilst this edition was in the press.

Meteorological Observations taken at the Observatory in the Hurricane, on the 20th January, 1834.

Jan. 1834.		Barometer.	Winds.	Remarks.
Day.	Hour.	Eng. Inch.		
19	7 P.M.	29.885	Wind increasing in violent gusts.	Clouds flying and occasional rain.
20	7 A.M.	29.775	Wind in strong and sudden gusts.	Looking wild & gloomy with heavy rain.
	10¾ ,,	29.685	Wind increasing in heavy gusts.	Raining heavily, scuds flying and looking wild.
	11¼ ,,	29.665	SE by E wind in very violent and sudden gusts.	Rain decreasing a lit-little, scuds still flying & looking very gloomy.
	11¾ ,,	29.655	Ditto ditto	Ditto ditto
	12 ,,	29.628	Wind increasing in very heavy gusts.	Raining very heavily & looking very wild.
	12½ ,,	29.575	Wind still increasing.	Raining very heavily.
	1 P.M.	29.570	Ditto ditto	Ditto ditto
	1½ ,,	29.510	Ditto ditto	Ditto ditto
	2 ,,	29.475	Ditto ditto	Ditto ditto
	2½ ,,	29.425	Ditto ditto	Ditto ditto
	3 ,,	29.385	Ditto ditto	Ditto ditto
	3½ ,,	29.295	Ditto ditto	Ditto ditto
	4 ,,	29.310	Wind increasing in sudden gusts.	Still raining heavily.
	4½ ,,	29.230	Wind increasing in heavy gusts.	Ditto
	5 ,,	29.195	Ditto ditto	Raining very heavily.
	5½ ,,	29.155	Ditto ditto	Ditto
	7½ ,,	29.085	Wind increasing in tremendous and sudden gusts.	Ditto
	8½ ,,	29.135	Wind abating a little.	Raining less heavily.
	9 ,,	29.170	Ditto ditto	Rain not quite so heavy.
	9¾ ,,	29.200	Wind still decreasing, but occasionally in heavy gusts.	Ditto ditto
	10¾ ,,	29.285	Ditto ditto	Raining heavily at intervals.
	11¼ ,,	29.300	Ditto ditto	Ditto ditto
	12¼ ,,	29.330	Ditto ditto	Ditto ditto
21	5¼ A.M.	29.655	Wind much abated.	Ditto ditto

* A ship called the Asia was also in this storm, and some observations upon it will be found in Mr. Thom's work, on "The Nature of Storms South of the Equator," page 87.

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Meteorological Observations—*continued.*

Jan. 1834.		Barometer.	Winds.	Remarks.
Day.	Hour.	Eng. Inch.		
	6½ ,,	29.695	Wind still abating.	Raining occasionally.
	11½ ,,	29.785	Ditto ditto	Very dull and cloudy.
	12¼ ,,	29.795	Still abating but occasionally strong.	Ditto ditto and occasional rain.
	2¼ P.M.	29.782	Ditto ditto	Ditto ditto
	3 ,,	29.782	Wd. increasing a little.	Raining heavily.
22	12 A.M.	29.895	Very light wind.	Cloudy.

J. A. LLOYD, Surveyor General and Civil Engineer.

Storm of 1836.

Another storm was experienced at Mauritius on March 6, 1836; during which, according to the statement of Captain Grierson, Royal Engineers (made from memory), "the wind blew, during the first half of the storm, from south by west, or nearly south. There was a calm of about an hour in the middle of the storm, after which a very heavy sea came rolling in from the north by east, or nearly north; half an hour after which occurrence, the wind came on again from the opposite quarter with very great violence."

In the "Nautical Magazine for June, 1837," the following report has been published of observations which were made during the storm by the Surveyor-General of Mauritius, at the Observatory, apparently with great care. The wind in that table is marked as oscillating in a remarkable manner. A mean of these oscillations makes the first portion of the hurricane to come from a little to the eastward of south, and the last portion a little to the westward of north, or nearly the same as the observations of Captain Grierson.

Immediately over Port Louis, where the Observatory stands, is a high and steep mountain, which probably influenced the direction of the gusts of wind. This hurricane came from the direction of Rodriguez.

Mr. Lloyd's Observations.

Meteorological Observations taken at the Observatory, Port Louis, Mauritius, during a Hurricane on the 5th, 6th, 7th, and 8th of March, 1836.—(*Copied from the Nautical Magazine for June*, 1837.)

Day.	Hour.	Barometer, English Inches.	Difference.	French Inches, and Lines.	Thermometer.	Sympiesometer.	Rain Gauge. I. T. H	Wind.
5th	8	29.930	..	28 1.00	82 0	29.14	0 0 0	Light wind.
	12	29.850	080	28 0.10	83.0	29.05	...	Very variable, and blowing hard. wind varied from S by W to E N E by N.
	4	29.740	110	27 10.86	83.5	28.94	...	S E very strong, E S E by S to S S W by S: raining.
	7½	29.770	030	27 11.19	82.8	28.98	...	S E very strong, and in gusts, S E by E to S W by S: raining.
	8	29.770	..	27 11.19	82.6	28.98	...	E N E ditto, N E by N to S S W: raining heavily.
6th	6	29.220	550	27 5.00	81.5	28.44	...	Varying from S to E in very strong gusts. Made a complete variation during the night: raining heavily.
	6½	29.190	030	27 4.66	81.5	28.42	..	Varying from S to E in very strong and sudden gusts: raining heavily.
	7	29.175	015	27 4.44	81.5	28.40	...	Varying from N E by N to S S W by W, in heavy and sudden gusts: still ditto.
	7½	29.175	..	27 4.44	81.5	28.40	...	A complete variation in heavy and tremendous gusts: do.
	8	29.120	055	27 3.88	81.5	28 34	..	Varying from E N E by N to S W by W, in heavy and continued gusts: ditto.
	8½	29.110	010	27 3.76	81.5	28.34	...	Varying from E by N to W S W, in heavy blasts: still raining.
	9	28.995	115	27 2 53	80.5	28.25	...	Varying from E N E by N to S S W by S, in heavy and sudden puffs: raining very heavily.
	9½	28.950	045	27 1.96	80.2	28 22	...	A complete variation in heavy and sudden gusts: ditto.
	10	28.845	105	27 0.72	80.0	28.15	...	Ditto, ditto.
	10½	28.860	015	27 0 95	80.0	28.12	...	Varying from N E by N to S W: ditto.
	11	28.775	085	36 11.95	79.5	28.04	...	Varying from E N E by N to S W: ditto.
	11½	28.695	080	26 11.03	79.0	27.93	...	Ditto, ditto: still raining.
	12	28.545	050	26 9 35	79.0	27.84	...	Ditto, ditto.
	12½	28.511	034	26 9.01	79.5	27.78	...	Ditto, ditto.
	1	28.470	041	26 8.56	79.8	27.72	...	Ditto to S S W by W: ditto.
	1½	28.375	095	26 7.43	79 8	27.60	...	Ditto, still high, and raining.
	2	28.330	045	26 6.98	80 2	27.52	...	Varying from N E to S W, decreasing in violence, and raining less heavily.

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Mr. Lloyd's observations.

Meteorological Observations—*continued.*

Day.	Hour	Barometer, English Inches.	Difference.	French Inches, and Lines.		Thermometer.	Symplesometer.	Rain Gauge. I.	T.	H	Winds.
6th	2½	28.295	035	26	6.53	80.5	27.52	0	0	0	Varying from E N E by N to S S W by W, in occasionally heavy puffs.
	3	28.245	050	26	5.97	80.5	. .	...			Ditto to S S W, in ditto.
	3½	28.275	030	26	6.30	80.5	. .	...			Ditto rain & wind decreasing.
	4	28.255	020	26	6.08	80.5	...	...			Ditto to S by W: ditto.
	4½	28.240	015	26	5.97	80.5	...	...			Varying from E by S to W by S: ditto.
	5	28.230	010	26	5.85	80.7	...	...			Varying from due S to due W, very light: raining.
	5½	28.235	005	26	5.86	81.0	...	. .			No wind—no variation.
	6	28.245	010	26	5.97	81.0	...	...			Varying from d. S to N N E by E, very light.
Calm.	6½	28.255	010	26	6.08	81.3	...	...			N by W, almost calm: wind varying from N W by N to N by E.
	7	28.275	020	26	6.30	81.0	...	...			Varying from N E to N N W by W, cloudy, and calm.
	7½	28.325	050	26	6.87	81.0	...	...			W by S to N by W, very cloudy, and blowing.
	8	28.420	095	26	7.99	80.2	27.69	...			Varying from S W to N W by N, ditto.
7th	7	29.355	935	27	6.47	79.0	28.77	...			Varying from N by E to W S W by S, blowing hard, and raining heavily.
	7½	29.385	030	27	6.80	79.0	28.81	...			Varying from W N W to N by W, ditto.
	8	29.400	015	27	7.03	79.0	28.82	...			Varying from W by N to N by W, ditto.
	8½	29.410	010	27	7.14	79.0	28.83	...			Varying from W N W to N N W, ditto.
	9	29.445	035	27	7.48	78.6	28.86	...			Varying from due W to due N, ditto.
	9½	29.450	005	27	7.59	79.5	28.86	...			Ditto, ditto.
	10	29.460	010	27	7.70	79.0	28.86	...			Varying from due N to W N W, ditto.
	10½	29.460	000	27	7.70	79.0	28.86	...			Varying from N by W to N W, ditto.
	1	29.468	008	27	7.82	78.7	28.87	...			Varying from due W to due N, ditto.
	1½	29.480	012	27	7.93	78.5	28.88	...			Varying from due W to due N, not quite so high.
	2¾	29.525	045	27	8.38	78.5	28.92	...			Ditto, ditto.
	4½	29.550	025	27	8.72	78.5	28.96	...			Ditto, wind decreasing, but still in heavy blasts occasionally.
	6½	29.595	045	27	9.17	78.5	29.01	...			Ditto, ditto.
	7½	29.835	240	27	11.87	78.5	29.24	8	6	7	Varying fr. S W to N by W.
8th	12	29.845	010	27	11.98	81.0	29.23	...			Ditto, W S W to N N W.
	4	29.845	000	27	11.98	81.0	29.23	...			Ditto, W by N to W by S.
	8	29.935	090	28	1.00	80.0	29.34	...			Ditto, N W to S W.

Extreme variation during the gale of the Barometer—English, 1.700 in.; French, 17.15 in.

J. A. LLOYD, Surveyor-General and Civil Engineer.

Whilst searching for records of storms in south latitude, my attention was directed to two, very disastrous in their consequences; which, even after a lapse of thirty years, have left a deep impression on the minds of many persons, from the great loss of life as well as property they occasioned. These were the storms of 1808 and 1809, encountered by the fleets of the East India Company, under convoy of his Majesty's ship Albion, Captain John Farrier, and of the Culloden, with the flag of Rear-Admiral Sir Edward Pellew, the first Lord Exmouth. The East India Company's ships Glory, Lord Nelson, and Experiment, foundered in the storm of 1808. The Lady Jane Dundas, Jane Duchess of Gordon, the Calcutta, and the Bengal, with his Majesty's brig of war Harrier, foundered in the hurricane of the year 1809.

A court of inquiry, composed of twelve East India Directors, was engaged for a considerable time investigating the subject of these losses; and the minutes of their proceedings are preserved at the India House, as well as the logs of the surviving ships. From each of these records I have been allowed to make any extracts I desired.

On Chart VIII. will be found the storm which was experienced by the East India fleet, under convoy of the Culloden line-of-battle ship and the Terpsichore frigate, in March, 1809. These ships had crossed the equator, and had sailed on their homeward passage, with fine weather, until about the 11th of March. The place of the fleet, at noon the next day, will be found on the chart, and the ships sailed in company until the 14th: on that day the storm became so violent, that they were dispersed; and I have taken advantage of

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this circumstance to compute each ship's place, where it was not previously marked on the log; and have also endeavoured to trace out the track of each vessel in the storm, in order thus to obtain simultaneous observations of the wind at different places.

Whilst this fleet, under the convoy of the Culloden, was sailing from India towards the Cape of Good Hope, four British men-of-war left the Cape on the 21st of February, 1809, intending to cruise off the islands of Mauritius and Bourbon: one of these, the Caledon, put back, having sprung a leak; the Nereide frigate, with the Racehorse and Harrier, proceeded for their cruising ground, and kept together until the 24th of February, when the Nereide separated from the other two, and followed a more northerly track. Their respective tracks are laid down on the chart from the 8th of March; and we shall find them, by the logs of the Nereide and Racehorse, encountering the storm on different days, according to the courses they sailed; but the Harrier has never been heard of since.

So many ships dispersed by the same storm over a great extent gives us the means of judging its nature, and of the course it took; and we find it, after having travelled obliquely with regard to the trade-wind from the east towards the west, recurving at the 25th and 30th degrees of south latitude, and going off to the south-eastward, with a remarkable degree of similarity to the manner in which hurricanes already traced in the northern hemisphere pass off to the north-eastward.

In the minutes of the proceedings of the Committee of Inquiry at the India House, most of the commanders speak of this hurricane as two distinct storms; and

throughout their evidence used the terms first and second gales.

This appeared an enigma until Chart VIII. was projected; but when the chart was finished, this very circumstance helped to explain the nature of the storm: for we see at once why the Huddart, William Pitt, Harriet, and Euphrates had fine weather for two days; and why the Huddart again met a storm with the wind blowing violently from the *north-west*, so that she was obliged to put all her guns but two down in the hold to stiffen her. These four ships, on the shaded portion of the plan, by lying-to and falling to the southward, got out of the hurricane; but the Huddart met it again when it had recurved, and this vessel encountered the last part of it about the time when the first part had reached the Racehorse.

The Northumberland, Indus, and Sovereign, also lay-to, and got out of the violence of the hurricane soon after the four ships on the shaded portion of the plan; but the Sir William Bensley and the St. Vincent scudded, by which they ran a day's sail a-head of the seven ships already named: and the chart shows where the Sir William Bensley was forced to lie-to, on the 17th, for twenty-one hours under bare poles, with the wind veering from north to west.

The Culloden scudded, the Terpsichore and the four missing Indiamen following her; and if they put before the wind, they must have sailed towards the track of the storm's centre, near which in all probability they foundered.

The Terpsichore lay-to on the 15th for sixteen hours, but the Culloden still stood on. By the 15th at noon the centre of the storm was due north of her, and

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was overtaking her when both ship and storm changed their courses, the ship (excepting for five hours) running under her foresail and close-reefed main-topsail to the south-west, whilst the hurricane commenced the curve which was soon afterwards to direct it to the south-east. There the Culloden, in her turn, got out of it with the wind blowing at south-west, whilst the dismasted Nereide was in a north-west storm on the opposite side of the great whirlwind.

The Nereide was sailing with fine weather and studding-sails set on the forenoon of the 15th; but by three o'clock in the afternoon of the next day she had reached the centre of the hurricane, where, by the last part of the Northumberland's log, she had a lull for half an hour; and before this period she was dismasted.

The Nereide's place on the chart for noon on the 16th March is her place computed by the dead reckoning; but the ships appear to have been all set more than twenty leagues to the southward in the current. This would place the Nereide to the south-west of the Culloden at mid-day on the 16th, and therefore on the middle of the storm's track, as dotted on the chart.

The account of the sail which the missing ships were under when last seen cannot fail to be interesting to every seaman, and I have found the following in the minutes of the Inquiry.

The Calcutta and Bengal were last seen about noon on the 14th, near the Admiral, and under their close-reefed main-topsails and foresails.

The Jane Duchess of Gordon was last seen on the 14th, by the Inglis, with her fore and main-topsails close-reefed and set: it was then blowing a storm,

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and she lost sight of her at three o'clock in the afternoon.

The Lady Jane Dundas was also last seen that day, with close-reefed fore and main-topsails set.

Each ship had on board from five to seven thousand bags of saltpetre; and in hurricanes, when water gets into a ship's hold, such cargoes as saltpetre and sugar are well known to melt, and the trim of a vessel thereby becomes deranged, and it is in consequence in danger of oversetting. In the Calypso, and H. M. ships Raleigh and Racer, we have instances of ships upsetting when under bare poles.

The Boyne's gale.

I have placed on the same chart, No. VIII., the track of the ship Boyne, commanded by Mr. Stockley, and marked the progress of a gale he encountered, as recorded in his log here printed. This storm crossed the land of Madagascar, and had been previously met on the east of that island by a Glasgow ship, the name of which Mr. Stockley was not able to recollect, and which he could not ascertain, as he was leaving England outward bound when I received his log. The Boyne's log will be found after those of the Culloden's fleet.

If this storm followed a course similar to that traced as encountered by the East India fleet and the Culloden, it must have passed near the Cape of Good Hope. To afford the means of verifying the chart, the whole of the logs are printed in detail. The four first given are those of the ships of war.

CHAP. VI.

Extract from the Log of H.M.S. CULLODEN (bearing the flag of Vice-Admiral Sir E. Pellew, Bart.), Captain P. B. Pellew, Commander.

Log of the Culloden.

Chart VIII.

Ship in front of storm.

Indication of storm.

Swell.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Wednesday, March 8, 1809.
1	..	..	W S W	S E	A.M. Moderate breezes.
2	..	..			
3	..	..			
4	..	..			Fresh winds, with rain.
5	..	..			
6	..	..	....	E by S	Ditto weather.
7	..	..			
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..	....	E S E	Lat. 18° 19′ S, long. 79° 30′ E.
P.M.					
1	..	..	W S W	S E	
2	..	..			
3	..	..			P.M. Strong winds and squally.
4	..	..			
5	..	..			Took in the third reef of the topsails.
6	..	..			Sent the royal-masts on deck.
7	..	..			
8	..	..			Close-reefed the topsails; handed the
9	..	..			main-topsail.
10	..	..			
11	..	..			
12	..	..			Strong winds, *with a great sea from the* S E.
					Thursday, March 9, 1809.
A.M.					
1	7	2	W S W	S E	A.M. Strong winds and squally.
2	7	0			
3	7	6			
4	7	6			Ditto weather.
5	7	2			
6	7	0			Out fourth reefs; set the mizen-toptail.
7	6	4			
8	7	4			
9	8	0			Long. (by sun and moon) 76° 15′E
10	8	0			Strong winds.
11	8	4			
12	8	2			Lat. 19° 22′ S, long. 76° 38′.
P.M.					Roderique, S 84° W, 130 leagues.
1	7	4	W S W	S E	
2	7	2			
3	7	2			P.M. Strong winds; loosed the mainsail.
4	7	4			
5	7	4			
6	7	6			Ditto weather; convoy in company.
7	7	0			
8	7	0			Furled the mainsail.
9	7	0			
10	7	4			Strong winds, *with a great sea from the*
11	7	4			S E.
12	7	2	....	SE by S	

Log of the Culloden.

Extract from the Log of H.M.S. CULLODEN—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.	
A.M.					Friday, March 10, 1809.	
1	7	2	W S W	S E by S	A.M. Strong winds.	
2	7	4	...	S E		
3	7	6				
4	7	4			Ditto weather; convoy in company,	
5	8	0			except the Northumberland.	
6	7	6			Up foresail.	
7	7	2			Saw the Northumberland a-stern.	
8	6	4			Long. (by lunar obs.) at A.M. 73° 53′ 30″.	
9	7	0				
10	7	2				
11	7	0			Lat. 20° 17′ S, long. 73° 58′ E.	
12	7	2			Thermometer 77°.	
					Cape St. Mary, S 79° W, 533 leagues.	
P.M.						
1	7	0	W S W	S E by S	P.M. Strong winds.	
2	6	6			Set the fore and main-topmast-staysails.	
3	7	4				
4	8	0				
5	7	6				
6	6	4				
7	6	6				
8	7	0			Strong breezes, *with a great swell from*	Swell
9	6	6			*the* S E.	from the
10	6	6				coming
11	6	6				storm.
12	7	0			Ditto weather; twelve ships in sight.	
					Saturday, March 11, 1809.	
A.M.						
1	6	0	W S W	S E by S	A.M. Strong winds.	
2	6	0				
3	6	2			Split the foresail; set the mainsail and	
4	7	2	....	S S E	main-topmast-staysail.	
5	6	6				
6	7	0				
7	7	2			Unbent the foresail, fore and mizen-top-	
8	7	0	W by S	S by E	sails, and bent new ones.	
9	7	4				
10	8	2				
11	8	4				
12	8	4			Lat. 20° 58′ S, long. 71° 10′ E.	
					Cape St. Mary, S 79° W, 483 leagues.	
P.M.						
1	6	2	W by S	S S E		
2	6	4				
3	6	4			P.M. Strong winds and squally.	
4	6	6	...	S E by S	Ditto weather; convoy in company.	
5	7	0				
6	6	4	....	S S E		
7	6	4				
8	7	2				
9	7	2			Strong breezes, with rain.	
10	7	6				
11	7	6				
12	7	4				

CHAP. VI.

Extract from the Log of H.M.S. CULLODEN—*continued.*

Log of the Culloden.	Hour.	K.	F.	Courses.	Winds.	Remarks.
						Sunday, March 12, 1809.
	A.M.					
	1	7	0	W by S	S by E	A.M. Strong winds; close-reefed the fore-topsail.
	2	7	2			
	3	7	4			
	4	7	6			Ditto weather; ten sail in sight.
	5	8	0			
Swell.	6	8	2			Strong winds and squally, *with a great sea;* all the fleet in sight.
	7	7	6			
	8	6	6	...	SE by S	
	9	7	4			
Fleet still in front of storm.	10	7	4			Fresh winds and squally.
	11	7	4			Cape St. Mary, S 80° W, 430 leagues.
	12	7	0			Lat. 20° 41′ S, long. 68° 14′ E. Thermometer 78°.
	P.M.					
	1	7	0	W by S	SE	
	2	6	0			
	3	6	2			P.M. Strong winds and squally.
	4	6	4			
	5	6	4			Ditto weather; convoy in company.
	6	6	2			
	7	6	4			
	8	6	4			
	9	6	4			Squally, with rain; seven ships in sight.
	10	7	0			
	11	7	0			
	12	7	4			
						Monday, March 13, 1809.
	A.M.					
	1	7	2	W by S	SE	A.M. Strong winds and squally.
	2	7	2			
	3	7	4			
Storm now overtaking the fleet.	4	7	4			Ditto weather; handed the fore-topsail at daylight; set it again.
	5	6	4			
	6	6	4			
	7	6	6			
	8	7	2	W		Strong breezes and cloudy; convoy in company.
	9	8	0	W by S	SSE	
	10	7	0			
	11	6	0			Cape St. Mary, S 80° W, 370 leagues.
	12	8	0			Lat. 22° 19′ S., long. 65° 23′ E. Thermometer 77½°.
	P.M.					
	1	8	0	W by S	SE	
	2	7	6			
	3	8	0			
	4	8	0			P.M. Strong winds and squally.
	5	7	4			
	6	7	4			Ditto weather, with rain.
	7	8	0			
	8	8	2			
	9	7	2			Fresh gales and squally.
	10	7	4			
	11	7	4	....	SSE	Five ships in sight.
	12	7	4			

Log of the Culloden.

Extract from the Log of H.M.S. CULLODEN—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.	
A.M.					Tuesday, March 14, 1809.	
1	7	0	W by S	S S E	A.M. Strong winds and squally, with hard rain; at daylight, squally, with hard rain; down top-gallant-yards; got the flying jib-boom in, and handed the fore-sail.	
2	7	0				
3	7	6				
4	7	4				
5	7	2				
6	6	6				
7	7	0				
8	7	0				
9	6	6			Strong gales and squally; got the jib-boom in; handed the fore-topsail; bent main-staysail and trysail.	
10	7	4	....	S E		
11	7	4				
12	7	2			Strong gales; six ships in sight. Lat. 22° 54′ S, long. 62° 14′ E. S W point Isle of France, N 65° W, 118 leagues.	
P.M.						
1	7	4	W by S	S E	P.M. Hard gales and thick weather, with a great sea.	
2	7	0				
3	7	0			Took in the main-topsail; set the main-staysail; it blew to pieces.	Main stay-sail blew away.
4	6	6				
5	6	4				
6	6	6				
7	7	2			Hard gales, with a heavy sea; none of the ships in sight.	Ships sepa-rating.
8	7	4				
9	7	4				
10	8	4				
11	7	6				
12	8	2			Very hard gales and a heavy sea.	
A.M.					Wednesday, March 15, 1809.	
1	9	2	W by S	S E by E	A.M. Heavy gales.	
2	9	0			The fore-staysail blew to pieces; a sea struck the larboard-quarter boat, broke the davit, and stove the boat; the star-board quarter gallery was washed away.	Near storm's vortex, and running parallel to it.
3	9	0				
4	9	0				
5	8	0				
6	8	0				
7	8	0				
8	9	0	W S W	E S E	Attempting to cut away the mizen-top-mast it went, and carried away the head of the mizenmast, the gaff, and part of the top; lost the whole of the rigging, &c.; bent the fore-topmast-staysail for a main-staysail.	
9	9	0				
10	7	4				
11	7	0				
12	8	4			S E point Isle of Bourbon, N 67° W, 170 miles. Lat. 22° 34′ S, long. 58° 38′ E.	
P.M.						
1	8	0	S W b W	E S E	P.M. Got the fore and main-top-gallant-masts on deck; double breeched and cleeted the lower-deck guns; got the main-runners up.	
2	8	0				
3	8	0			Took in the slack of the lee main rigging. Hard gales, with tremendous heavy gusts.	
4	8	0	S W ½ W	E	The gale appeared to break.	
5	7	6				
6	7	0			More moderate, with less sea; set the reefed foresail.	
7	7	0				
8	7	6	S W			

CHAP. VI.

Log of the Culloden.

Extract from the Log of H.M.S. Culloden—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Wednesday, March 15, 1809.
9	8	0	S W	E	
10	8	6			
11	8	0			
12	8	0			Strong gales, with rain at times. Found 150 yards of the spanker saved, the rest was lost with the mizenmast head, and spanker-boom; found several knees broke, the transom worked very much, and the nails of the lower deck planks drawn three or four inches; the upper stroke broken in the wake of the mainmast, &c.
A.M.					Thursday, March 16, 1809.
1	7	0	S W	E	
2	7	0			
3	7	6			
4	7	4			
5	7	2			
6	6	6			
7	7	0			
8, 9, 10, 11, 12	..	..	up S S E off S b W	E by N	A.M. Strong gales and cloudy. At 7, up foresail; brought-to for the convoy: employed mending the service of the rigging, putting the ship to rights, &c. Lat. 26° 6′ S, long. 56° 37′ E. Cape St. Mary, N 87° W, 213 leagues.
P.M.					
1	8	4	W N W	E N E	P.M. Strong winds and hazy.
2	8	6			
3	9	4			
4	10	0			Set up the larboard main-rigging.
5	9	0	....	N E by E	
6	9	0			
7	10	4	W		Hard gales, with rain and a heavy sea. Larboard gallery washed away.
8	10	4			
9	9	0			A very hard squall; clewed up the main-topsail; it blew away; hauled up the foresail and handed it; the ship strained and laboured much, one chain and one hand pump kept her free.
10	9	0	W by N		
11	7	4			
12	7	0			
A.M.					Friday, March 17, 1809.
1	4	0	....	N N E	A.M. Very hard gales, with heavy sea.
2	4	0	...	N	
3	3	6			Set the trysail.
4	3	4	....	N N W	The ship strained, and leaked in every part of the upper works and deck; at daylight, found the fore and main belly-stays, the inner bob-stays, and laniards of the two foremost fore-shrouds carried away.
5, 6, 7, 8, 9	..	..	up S W ½ W / off	N W	
10, 11, 12	..	..	S S W	W N W	Cape St. Mary, N 82° W, 194 leagues. Lat. 26° 53′ S, long. 54° 42′ E.

Storm re-curving towards S. E.

Log of the Culloden.

Extract from the Log of H.M.S. Culloden—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Friday, March 17, 1809.
P.M. 1			up		
2			S S W	W by S	P.M. Fresh gales and cloudy, with a great *swell from the S W.*
3			off		
4			S by E		
5	1	6	N W b N ½ N		
6	2	0	N W b N		
7	2	0			
8	2	0			
9	2	0			
10	2	4	N W		
11	2	6			
12	4	0	N W b W	S W	Wind veering to the southward; fine weather.

Log of the Terpsichore.

Extract from the Log of H.M.S. Terpsichore, J. M. Gordon, Captain.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Monday, March 13, 1809.
A.M. 1	7	0	W by S	S E by S	A.M. Strong breezes, with hard squalls and rain. 12.30. Up foresail; ship making five inches per hour.
2	6	4			
3	7	0			
4	6	4			Ditto weather; Admiral W ½ S.
5	6	0			
6	6	0			At 6, fresh breezes and thick cloudy weather.
7	6	0			
8	6	2			
9	6	4			
10	6	4	up S S W off S W		At 10, up foresail, and hove-to. 10.15. bore up; furled the mainsail and mizen-topsail.
11	5	4	W by S	S E	
12	7	2	....		Strong winds and squally weather; Admiral W by S 3 or 4 miles. Course, S 77° W, distance 155. Lat. 22° 14′, long. 64° 42′ E. Cape St. Mary, S 80° 20′ W, 399 leagues.
P.M. 1	7	0	W by S	S E by E	P.M. Fresh breezes and squally, with rain.
2	7	4			
3	7	6			
4	7	4			Ditto weather; Admiral W by S.
5	6	6			
6	6	2			Set the foresail.
7	6	4			Up foresail.
8	7	4			Squally, with rain.
[illegible]	7	0			
10	7	0			
11	7	0			Strong breezes and squally weather; Admiral W by S.
12	7	0	. . .	S E	

CHAP. VI.

Log of the Terpsichore.

Extract from the Log of H.M.S. TERPSICHORE—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
	A.M.					Tuesday, March 14, 1809.
	1	6	4	W by S	E S E	A.M. Fresh gales and squally, with rain. 1.30. Burnt a blue light.
	2	6	0			At 2, lowered the main-topsail.
	3	6	2			
	4	6	4			Ditto weather; close-reefed the main-topsail and furled the fore-topsail.
	5	6	4			
	6	6	6			Strong gales and thick squally weather; down main-top-gallant-yard and mizen-top-gallant-mast; bent storm-staysails and reefed the foresail.
	7	7	0			
	8	7	0			At 8, strong gales and thick heavy weather; struck the fore and main-top-gallant-mast and set storm-staysail; carried away the strap of the main-stay-sail-sheet and split the sail.
	9	7	0			
	10	6	0			
	11	5	4			
Swell from eastward.	12	5	4	....	S E by E	Noon. Strong gales and thick rainy weather, *a heavy sea from the eastward;* six of the convoy in sight. Course, S 82° W, distance 158. Lat. 22° 36′, long. 61° 56′ E. Cape St. Mary, S 80° 15′ W, 343 leagues.
	P.M.					
	1	5	4	W by S	S E by E	P.M. Hard gales and thick cloudy weather; ship making nine inches per hour; sent top-gallant-mast on deck and rigged jib-boom in.
	2	5	2			2.40. Carried away the tiller three feet from the rudder-head; clewed up & furled the main-topsail; shipped the short tiller.
	3	5	0			
	4	4	4			At 4, ditto weather.
	5	5	4			At 5.40, a sea broke over the stern, stove the jolly-boat to pieces.
	6	6	4			At 6, ditto weather.
	7	6	0			
Culloden in sight.	8	6	4			At 8, strong gales, with rain, and a heavy sea running; employed at the chain-pumps.
	9	6	0			
	10	6	4			
	11	6	6			At 11, the Admiral's light W by N.
	12	7	4	....	E	Midnight. Hard gales & squally weather.
	A.M.					Wednesday, March 15, 1809.
	1	7	0	W by S	E	A.M. Hard gales and thick cloudy weather. At 1, the ship brought by the lee; loosened the foresail; burnt a blue light; the spare main-topsail-yard washed away from chain.
	2	7	0			
	3	7	0			
	4	7	0			At 4, ditto weather.
	5	7	4			
Sails splitting.	6	7	4			Excessive strong gales and thick rainy weather; split every staysail we attempted to set.
	7	8	0			
	8	8	0			At 8, do. weather; shipped a sea over the larboard-quarter, which greatly damaged it.
	9	7	6	W		At 9, saw a sail in the W N W; ship making two feet per hour.

Log of the Terpsichore.

Extract from the Log of H.M.S. TERPSICHORE—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
A.M.					
10	7	6	W	E	
11	7	4			
12	7	4	....	E by N	Noon. Hard gales, with a heavy sea running. Course, S 76° W, distance 160. Lat. 23° 13′ S, long. 60° 1′ E. Cape St. Mary, Madagascar, S 8° 10′ W, 304 leagues.
P.M.					
1	8	0	W	E N E	P.M. Strong gales and thick weather, with rain; shipped a number of seas.
2	6	0			At 2.30, being under the goose wing of the foresail, it blew from the yard, and the ship broached-to; attempted to set the fore storm-staysail, but it blew to pieces; found we could set no sail; cut away the mizen-topmast, but to no effect; put the helm a-lee and kept her to; ship laboured much; at the pumps.
3	4	0			
4	0	0	up S S E off S		
5	0	0	up S S E off S b W		
6					At 6, nothing in sight; found two of the main-shrouds gone larboard-side; got the runners and tackles up, and secured.
7	0	0	do.		
8					At 8, ditto weather; employed at the pumps.
9					
10	0	0	up S S E off S S W		
11					
12	..	..	....	E N E	At 12, heavy gales and thick weather.
					Thursday, March 16, 1809.
A.M.					
1				E N E	A.M. Hard gales, with heavy rain; wind and sea somewhat abating; ship making two feet per hour. Strong winds and cloudy weather, but much clearer. At daylight, more moderate; found most of the topmast-stays and a number of the laniards of the lower rigging carried away. 7.40. Made sail and bore up.
2	0		up S E off S		
3					
4				N E	
5					
6	0	0	up S E b E off S S E		
7					
8	3	0	W by S	N E	At 8, strong winds and cloudy weather; nothing in sight.
9	7	0			
10	7	4			
11	7	4			
12	7	4	....	N E	Noon. Strong breezes and clear weather; nothing in sight. Course, S 67° 0′ W, distance 81. Lat. 23° 44′ S, long. 58° 41′ E. St. Mary's, S 82° 35′ W, 276 leagues.
P. M.					
1	7	4	W	N N E	P.M. Fresh breezes and cloudy weather.
2	7	4			
3	7	4			
4	7	4			At 4, ditto weather.
5	7	4			
6	7	6			At 6, fresh breezes and cloudy weather; set the foresail.
7	8	0			
8	9	0			At 8, strong ditto, ditto.
9	7	4			

Hove-to.

No ship in sight.

Storm moving southward.

CHAP. VI.

Extract from the Log of H. M. S. TERPSICHORE—*continued*.

	Hour.	K.	F.	Courses.	Winds.	Remarks.
Log of the Terpsichore.						Thursday, March 16, 1809.
	P.M. 10	6	4	W	N N E	At 10, hand pumps kept going.
	11	6	4			
	12	6	4	....	N E	At 12, fresh breezes and hazy weather.
						Friday, March 17, 1809.
	A.M. 1	5	4	W by S	N	A.M. Fresh breezes and cloudy; ship making twenty inches per hour.
	2	4	4			At 2, took in the fore-topsail.
	3	3	0			
	4	3	0			At 4, fresh breezes, with a head sea;
	5	3	0	W S W	N W b.N	close reefed the main topsail.
	6	3	0			
	7	3	0			
	8	3	0	S W b.W		
	9	3	0			
	10	2	6			
	11	2	4			
Storm re-curving towards S.E.	12	2	0	....	N W	Noon. Moderate breezes and cloudy; weather; hove-to, to sling the main-yard afresh.
						Course, S. 64° 0′ W, distance 125.
	P.M.					Lat. 25° 29′ S, long. 56° 28′ E.
	1	0	0	up S W off S b.W	N W	Cape St. Mary, N 88° W, 180 leagues. P.M. Moderate and cloudy weather.
	2					
	3	1	0	S W by S	W N W	At 2, filled and set the mainsail.
Swell from westward.	4	1	4	S S W		Ditto weather; *a heavy swell from the westward.*
	5	2	0	S by W		
	6	1	4	S		Pumped ship occasionally.
	7	2	0			
	8	2	2	S by W		Light breezes and dark cloudy weather.
	9	1	4	S		
	10	1	6			
	11	2	2	S by E		
	12	2	4	S S E	S W	Ditto weather; wore ship.
						Saturday, March, 18, 1809.
Storm leaving Terpsichore.	A.M. 1	2	0	W by N	variable	A.M. Fresh breezes and cloudy; fidded top gallant-mast.
	2	3	0	W		2.30. Out third reef of the topsails and
	3	4	4			set the jib.
	4	5	0			Ditto weather; observed a deal of the
	5	6	4			copper off on each side of the stern. At
	6	6	4			daylight, saw a sail bearing S E by E; shortened sail.
	7	2	0	W by S		At 7, the stranger proved, by signal, to be the Earl St. Vincent, one of the convoy.
	8	2	0	....	S	At 8, moderate breezes and hazy weather.
	9	2	6			
	10	5	0	W by S ½ S		
	11	6	6	W	S S W	

CHAP. VI.

Extract from the Log of H. M. S. TERPSICHORE—*concluded*.

Log of the Terpsichore.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Saturday, March 18, 1809.
A.M. 12	7	0	W.	S S W	Noon. Fresh winds; Earl St. Vincent in company. Lat. 25° 50′ S, long 55° 8′ E. Cape St. Mary, N 88° 10′ W, 180 leagues.
P.M. 1	7	2			P.M. Fresh breezes and cloudy weather.
2	6	6			
3	6	4			
4	6	0			At 4, ditto weather; Earl St. Vincent in company.
5	5	4			Unfidded the fore-topmast.
6	5	2			
7	5	2			
8	5	2			At 8, ditto weather.
9	5	0			
10	5	0			
11	5	2			
12	5	6	....	S	

Copy of the Log of H. M. S. NEREIDE.—In *Civil Time*.

Log of the Nereide from the Cape of Good Hope.

Hour.	K.	F	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
A.M. 1	5	6	N E	S S W	A.M. Moderate breezes and cloudy.
2	5	6			
3	6	0	....	S by E	Varying to the eastward.
4	6	4			At daylight, moderate breezes and fine weather.
5	6	6			
6	7	2	....	[illegible]	Set fore lower-studding-sails.
7	7	6			
8	4	0	N E		Set the fore-topmast and top-gallant-studding-sails.
	4	2	½ N		
9	8	2			Wind freshening; down flying-jib.
10	9	2	N E		In studding-sails and top-gallant-sails.
11	9	2			Lat. 27° 35′ S, long. 55° 30′ E.
12	9	2			Isle of Bourbon, bearing N 4° E, 370 miles.
P.M. 1	10	0	N E	S S W	P M. Fresh gales and clear weather; in second reef in the topsails.
2	10	2			
3	10	2			
4	10	0			Down fore-topmast-staysail; close-reefed main-topsail; down top-gallant-yards; the same weather. Struck the top-gallant-mast.
5	8	6			
[illegible]	10	0			
7	10	0			
8	10	0			Strong gales and hazy weather.
[illegible]	9	6			

Sailing towards the storm.

Chart VIII.

CHAP. VI.

Copy of the Log of H. M. S. Nereide—*continued.*

Log of the Nereide.	Hour.	K.	P.	Courses.	Wind.	Remarks.
						Wednesday, March 15, 1809.
Still sailing towards storm.	P.M. 10	[illegible]	6	N E	S S W	Fresh gales, with lightning; furled the mainsail.
	11	9	6			Bent and set the main-staysail.
	12	10	2			Midnight. Strong gales and dark gloomy weather, and a heavy sea on.
						Thursday, March 16, 1809.
	A.M. 1	9	0	N E	S S W	A.M. Handed the fore and main topsails; up foresail and furled it; bent the trysail.
	2	7	4			
	[illegible]	6	0			
	4	5	2	....	S E	At 4, strong gales and cloudy weather, with rain.
	5	3	6			Strong gales; carried away the main-staysail sheet and split the sail.
	6			up N E		Strong gales, with a heavy sea; ship laboring very much; a black boy fell over and was drowned.
	7	0	0	by E off		
	8			N N E		
Near the vortex.	9			up N E	SE b E	
	10	0	0	off N b E		
	11					11 40. Gale still increasing to a hurricane, put the helm up, but found she would not fall off; loosened the foresail, which blew out of the boltrope; righted the helm; tried her again, with no better success; the gale violently increasing, found it necessary for the safety of the ship to cut away the mizenmast. 11 45. Cut it away, still she would not go off; the main-topmast blew over the side. 11.55. Cut away the mainmast, when she veered before the wind.
				up N E		
		0	0	by N	South-erly	
Cut mizen-mast,				off N		
mainmast,	12				Vari[illegible]	At 12, ditto weather.
						No observation.
	P.M. 1	11	4	W	[illegible]	P.M. Heavy gales and squally; lost, in cutting away the masts, spanker and mizen-topsail, with all the standing and running rigging; mainsail, main-topsail, with standing and running rigging.
fore-topmast.	2	11	4			1.30. Cut away the fore topmast to preserve the foremast; saved the topsail, with part of standing and running rigging; foresail splitting, saved fifty yards of canvas, with the boltrope; lost a cutter from the quarter.
	3	5	2			At 3, wind veered to W.
	4	3	2	E S S	W N W	At 4, heavy squalls; got the foresail ready for bringing-to the yard; ditto gales; employed securing foremast and fore yard.
	5	11	4			
	6	11	0	S E by S		
	7	10	0			
	8	10	0	S S E		At 8, heavy squalls, with constant rain.
	9	11	0	S E		
	10	10	0	S E by E	N W	
	11	[illegible]	0	S E	N W b W	
Pooped.	12	11	4		N W	At 12, sea running extremely high pooped us, and stove in the dead-lights; employed securing ditto.

Log of the Nereide.

Copy of the Log of H. M. S. NEREIDE—*concluded.*

Hour	K.	F.	Courses.	Winds.	Remarks.
A.M.					Friday, March 17, 1809.
1	11	4	S by E	N by W	Heavy gales and squally.
2	11	4			
3	11	4	S S E	N N W	
4	11	0			Ditto weather.
5	9	0			
6	10	0			Ditto, ditto.
7	10	0			
8	9	0			More moderate; bent the foresail.
9	9	4	S E by S	N W b N	Ditto weather; people variously em-
10	9	2	S E	N W	ployed clearing the wreck.
11	8	4			
12	9	0			Ditto weather.
P.M.					No observation.
1	7	0	S E by E ½ E	N W b W	Fresh gales and cloudy weather; bent and set foresail and fore-topmost-staysail.
2	6	0	S E by E		Hauled to the wind on the starboard
	2	0			tack.
3	2	0	S W by S	N W	Ditto weather.
4	3	4	S S W ½ W		4.30. Down topmast-staysail.
5	3	0	S S W	W S W	
6	2	4	S by W		
7	2	0	N by E		
8	2	4			Fresh breezes and cloudy; wore ship.
9	2	4		N W b W	More moderate, with a heavy swell.
10	2	2			
11	2	4			
12	2	2	N		Moderate and cloudy weather.
A.M.					Saturday, March 18, 1809.
1	..	..	N by W	Variable	
2	..	..	N W	S W b W	
3	..	..			
4	..	..	N W b W	S W	Fresh breezes and cloudy weather.
5	..	..			Ditto weather, with rain at intervals;
6	..	..	W N W		got up a pair of sheers; set maintop-
7	..	..			gallantsail on it.
8	..	..			Ditto weather; made all possible sail;
9	..	..			cut the stump of the mast up.
10	..	..			
11	..	..			
12	..	..			Ditto weather.
					Lat. 26° 46′ S, long. 58° 16′ E.
					Juan de Lisboa, N 85° 30′ W 155 miles.
P.M.					
1	..	..	W by N	S by W	Fresh breezes and cloudy; down mizen.
2	..	..			
3	..	..			
4	..	..			Ditto weather.
5	..	..			
6	..	..			Fresh breezes and cloudy; down mizen.
7	..	..			
8	..	..			Ditto, ditto.
9	..	..			Moderate and cloudy.
10	..	..			
11	..	..			
12	..	..			Ditto, ditto.
					(Signed) CORBET, Captain.

CHAP. VI.

Extract from the Log of H.M.S. RACEHORSE, Wm. Fisher, Esq., Commander.—Kept by R. Nellson, Master.

Log of the Racehorse.

	Hour.	K.	F.	Courses.	Winds.	Remarks.
	A.M.					Monday, March 13, 1809.
	1	6	4	E	W N W	Fresh breeze and cloudy weather; down
	2	6	0			main-staysail.
	3	6	0			
	4	6	2			4. Moderate and fine weather.
H.M. Brig Harrier in company.	5	6	0			Altered the course to E by N.
	6	6	0	E by N	W N W	Made signal 89 to Harrier.
	7	6	0			
	8	4	0			
	9	3	4			
	10	4	4			
	11	4	4			[in company.
	12	3	4	E by N	W N W	Light breeze and fine weather; Harrier
						Course. N 62° E, distance 158.
						Lat 36° 59′ S, long. 56° 30′, D. R.
						Island of Roderique, N 19° E, 1100 miles.
	P.M.					
	1	3	0	E by N	W by S	Light breeze and fine weather.
	2	3	2			
	3	4	0			
	4	2	4	...	W S W	
	5	5	4			5. Light airs and clear weather.
	6	5	4			
	7	5	0			
	8	5	4	....	S W	Moderate and clear weather.
	9	5	4			
	10	4	0			
	11	3	4			
	12	4	2			Ditto weather; Harrier in company.
	A.M.					Tuesday, March 14, 1809.
	1	4	4	E by N	SW by S	Light breezes and fine weather.
	2	4	0			
	3	3	6			
	4	3	0			
	5	3	2			At daylight ditto weather; saw the
	6	3	0			Harrier.
	7	2	0			
	8	2	0			8. Light airs and fine weather; Harrier
Harrier astern.	9	2	4			astern.
	10	2	2			
	11	2	0			
	12	2	0			Light airs and cloudy weather.
						Course, N 51° E, distance 96 miles.
						Lat. 35° 58′ S, long. 58° 28′ 30″, chro. 58° 3′,
						Roderique, N 16° E, 983 miles. [D. R.
	P.M.					
	1	1	2	E by N	S W	Light breeze, inclinable to calm.
	2	1	2			
	3	1	0			
	4	1	0			4. Ditto weather; Harrier a long way
Harrier when last seen.	5	0	0	Head fr. SE to ENE	.....	astern. Calm and cloudy weather; shortened sail.
	6	0	0			

Log of the Racehorse.

Extract from the Log of the RACEHORSE—*continued.*

Hour	K.	F.	Courses.	Winds.	Remarks.
P.M.					Tuesday, March 14, 1809.
7	0	0	Head fr.		
8	0	0	E to S E		7.30. A light breeze from N N W.
9	4-3	4			
10	3	4			
11	3	4			
12	3	4			12. Light breeze and cloudy; Harrier not in sight.
A.M.					Wednesday, March 15, 1809.
1	3	4	E by N	N W b W	Light breeze and clear weather.
2	4	2			
3	5	4			
4	5	4		W	
5	6	0			5. *Harrier not in sight.*
6	6	2			
7	5	4			
8	6	0			8. Ditto weather.
9	3-2	0			
10	3	6	E N E	S W	
11	4	2			
12	4	4			12. *Harrier not in sight.* Course, N 49° E, distance, 83 miles. Lat. 35° 2′ S, long. 59° 22′ E. D. R. Roderique, N 12° 23′ E, distance, 954 miles.
P.M.					
1	4	4	NE by E ½ E	S S W	Fresh breeze and fine weather.
2	6	4	E N E		
3	7	2	NE by E	S S E	
4	7	0			4. Ditto weather.
5	8	4	N E	E S E	
6	9	0			6. Fresh breeze and cloudy weather.
7	8	0			
8	8	0			8. Strong breeze; furled main-top-gallant-sail; close-reefed fore-topsail; took third reef in main-topsail; struck fore-top-gallant-mast.
9	6	0			
10	7	0			
11	6	0			11. Close-reefed main-topsail, and reefed [the courses.
12	5	0			12. Fresh gale.
A.M.					Thursday, March 16, 1809.
1	6	0	N E	E S E	Strong breeze and cloudy weather.
2	6	0			
3	6	0			
4	6	4			
5	6	4			
6	5	0			6. Fresh breeze, with rain.
7	4	6	NE by N	E by S	
8	6	0	N N E		8. Ditto weather.
9	6	4			
10	7	4	N by E	E by N	
11	6	0	N	E N E	
12	6	0	S E		Noon. Ditto, ditto. Course, N to E, distance 144 miles. [D.R. Lat. 32° 40′ S, long. 61° 14′ E ch., 59° 52′ Port Louis, Isle of France, N 9° 40′ W, distance 761 miles.

Getting into the storm.

Port-tack.

CHAP. VI.

Log of the Racehorse.

Extract from the Log of the RACEHORSE—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
	P.M.					Thursday, March 16, 1809.
	1	4	0	S E	E N E	Fresh breeze and cloudy weather.
	2	5	0	S E ½ S		
	3	6	0	S E by S		
	4	6	2			
	5	7	0			
	6	6	4			
	7	5	2	S E ½ S	E N E	
	8	4	6			8. Ditto weather.
	9	5	0	S E		
	10	5	0			
	11	5	2	S E by S		
	12	5	2	..	E N E	Midnight. Strong breeze and cloudy.
	A.M.					Friday, March 17, 1809.
	1	3	6	S E by S	E by N	Strong breeze and cloudy weather.
	2	4	0			
	3	2	4			
	4	2	1			4. Ditto weather.
	5	1	4	E S E		
	6	2	0			
	7	6	0	S E by E		
	8	6	6			8. Fresh breeze, ditto.
	9	6	2			
	10	7	0			
	11	5	0	S E		
		3	0	S E by E	E by N	
	12	8	0			Noon. Ditto, ditto. Course, S 57° E, distance 121 miles. [D.R. Lat. 33° 44′ S, long. 62° 30′ chro. 61° 49′. Roderique, N0° 40′ E, distance 844 miles.
	P.M.					
	1	8	0	S E by E	E by N	Fresh breeze and cloudy, with rain at times.
	2	7	0			
	3	6	4			
	4	3	4			Ditto weather.
	5	1	2	E by S	N E by N	
Wore.		1	2	N E	S E by E	
	6	2	0			6. Light breezes and cloudy, with rain.
	7	2	4			
	8	2	4			8. Thick, rainy weather.
	9	3	0			
	10	6	4			
	11	6	4			
	12	8	0	..	S	Fresh breeze and rainy weather.
	A.M.					Saturday, March 18, 1809.
Storm moving south-eastward.	1	8	0	N E	S	Strong breeze and squally, with rain.
	2	8	0			
	3	8	0			3. Strong gales, with heavy rain.
	4	7	0			
	5	6	0			
	6	3	4	N E by N		6. Ditto, ditto. 6.30. A heavy swell; down try and foresails; kept before the sea.
		3	4	N by E		
	7	7	0	N		
	8	7	0	N by E		8. Heavy gale, with rain; got in the spritsail-yard.
	9	8	0			
	10	9	0	N by W	S E by S	
	11	9	0	N W b N		

Extract from the Log of the Racehorse—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Saturday, March 18, 1809.
12	9	6	N W	SE by E	12. The sea running very high; brought her to on the starboard tack under try and fore staysails. Course, N 26° E, distance 135 miles. Lat. 31° 42′ D.R., long. 63° 41′. No observation D.R. Roderique, N, distance 722 miles. Port Louis, N 25° 45′ W, 692 miles.
P.M.					
1	..	..			Strong gales, with heavy squalls and rain.
2	..	..	up E S E	S	
3	..	..			
4	..	..	off N E		4. Ditto, ditto.
5	..	..			5. The small cutter was carried away (by a sea) from the stern.
6	..	..			
7	..	..	up E S E		
8	..	..	off E N E		
9	..	..	up E b N		
10	..	..			
11	..	..	off N E		
12	..	..		S S E	12. Ditto weather.
A.M.					Sunday, March 19, 1809.
1	..	..	up E b N off N E	S S E	Strong gale and squally, with rain.
2	..	..			
3	..	..	up E N E		
4	..	..	off N E by N		
5	..	..			5. More moderate weather.
6	..	..	up N E		6. Moderate and cloudy.
7	..	..			
8	..	..	off N b E		8. Fresh breeze and cloudy.
9	2	4	N by E	E by S	
10	4	4			
11	4	4			
12	3	4	N ½ E		12 Moderate and clear weather. Course, N 34° W, distance 22 miles. Lat. 31° 26′ S, long. 62° 48′ chro., 63° 26′ D.R. Roderique, N 1° W, 706 miles.
P.M.					
1	2	0	N	E N E	Moderate breeze and cloudy weather.
2	2	4			
3	3	0			
4	3	2			4 Light breeze and rainy weather.
5	2	0	N by W		Ditto, ditto.
6	3	0	..	Variable	
7	1	0	N by E		
8	1	0	N		
9	2	0	N by E		
10	3	4			
11	3	0	N ½ W		11. Squally, with rain.
12	0	0	head fr. N to N W		12. Ditto, ditto.

CHAP. VI.

The four next logs are those of the ships which first got out of the hurricane, and whose places are marked on the shaded part of the Chart, viz., the Huddart, William Pitt, Harriet, and Euphrates.

Log of the Huddart.

Extract from the Log of the H. C. S. HUDDART,* Captain Wm. Nesbitt, towards England.—In *Nautical Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	5	4	W S W	S E by S	P.M. Fresh breezes and squally weather throughout.
2	5	4			
3	5	4			
4	5	4			
5	5	4			
6	5	4			
7	5	0			
8	5	0			
9	5	0			
10	6	0			
11	6	0			
12	6	0			
A.M.					
1	6	0			
2	6	0			
3	6	0			
4	6	0			
5	6	4			
6	6	4			
7	6	4			
8	6	4			
9	6	0			A.M. At 8.30, departed this life Captain John Robinson; at noon, committed the body to the deep with the usual ceremonies.
10	6	0			
11	6	0			
12	6	4			Lat. observed, 22° 25′ S, long. 65° 23′ E. (Signed) C. ARKCOLL.
P.M.					Tuesday, March 14, 1809.
1	5	..	W S W	S E by S	P.M. First and middle parts a strong trade, the weather heavy and unsettled, with constant hard rain and a rising sea, latterly increasing to a heavy gale, with violent squalls from the S S E, and shipping much water.
2	5	..			
3	4	..			
4	4	..			
5	3	..			
6	3	..			
7	3	..			
8	3	..			
9	4	..			
10	4	..			
11	4	..			
12	4	..			

* H. C. S. Honourable Company's Ship.

Log of the Huddart.

Extract from the Log of the H. C. S. HUDDART—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Tuesday, March 14, 1809.
1	3	..	WbyS½S	E S by S	
2	3	..			
3	3	..			
4	3	..		S E	A.M. At 4.30, the Admiral's light bore
5	3	..			E S E; at daylight very thick weather,
6	3	..	W S W		could see only three of the fleet in the
7	4	..			S E, but could not distinguish the ships; the gale increasing rapidly.
8	4	..			At 8, the Harriet passed us under close-reefed topsails and foresail.
9	4	..			At 9, in a violent gust of wind, the fore-
10	0	..			sail blew to ribbons, and immediately
11	0	..			after the main-topsail in like manner; got the new foresail ready to bend, but the gale was so violent could not haul it to the yard; set the storm, main, and fore stayasils, and laid the ship to the wind; one ship bearing S S W likewise hove-to; latterly a very heavy sea running, with furious gusts of wind and hard rain.
12	0	..			Noon. The William Pitt and Earl St. Vincent on our weather-beam, and two others in sight; could not see the Commodore.
					No observation.
					Lat. 22° 24′, long. 64° 11′.
					(Signed) F. DOW.
P.M.			[S		Wednesday, March 15, 1809.
1	0	..	W^d up to	S S E	P.M. The gale increasing; reefed the
2	0	..	off to SW		main-stayasil and set it, the sea running
3	0	..			excessively high, and making frequent
4	5	..			breaches over the ship.
5	5	.			At 3.30, shipped a very heavy sea, which
6	5	..			upset most of the guns, stove the cutter to
7	5	..			pieces (on the larboard quarter), the wea-
8	5	..			ther waist and gang boards, washed off the
9	5	..			lee ones, with the rail, &c.; laid the ship for
10	5	..			some time on her larboard side, and tore
11	5	..			with the weight of water her main-stayasil
12	2	4			to pieces; hove overboard several of the star- board guns; set the fore-topmast stayasil.
A.M.					At 4.30, wore ship and kept her head W S W, all pumps going, blowing with ex- cessive violence in gusts; ship making good
1	..	..			weather till 1 A.M., when she most unfor-
2	..	..			tunately brought by the lee, in doing which
3	..	..			she shipped a heavy sea on her starboard
4	..	..			quarter and stern, and was immediately
5	..	..			afterwards laid over on her larboard beam-
6	..	..			ends, her lee-side being entirely under
7	..	..			water; her gunwale-rail, gang-boards, &c., were soon swept away, and every thing on that side dashed to pieces and washed overboard; made every exertion to wear ship, but without success; the storm fore-

CHAP. VI.

Log of the Huddart.

Extract from the Log of the H. C. S. HUDDART—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
	A.M.			W^d up to S off to S W	S S E	Wednesday, March 15, 1809. staysail and fore-topmast staysail blowing to ribbons; attempted to set the jib, but it was likewise instantly blown to pieces; the night being excessively dark, it was judged too dangerous to attempt cutting away the mizenmast till daylight; cut away and hove overboard as many of our lee guns as we could possibly get at, and kept all hands at the pumps from the time of our being brought by the lee till near daylight; the situation of the ship was very perilous, her larboard side up to the lee-coamings of the hatches being frequently under water, and the ship laying over so much that the men could scarcely stand to the pumps, and in the darkness of the night, from the railing being dashed away to leeward, it was dangerous for the men to go over to the lee side; towards daylight, the gale abating and the sea rather falling, we were enabled to keep the water under by the pumps.
	8	..	..			A.M. By 8, every appearance of fine weather, the gusts being less violent, and the sea falling fast.
	9	..	..			
	10	.	..			
Ship following storm,	11	..	..			At 11, moderate, set the main-topmast-staysail. At 11.30, *wore ship and stood before the wind*, in hopes of joining the fleet; *the wind continued.* In the first part of the gale the wind was S S E, shifting latterly to E and N E.
but falls behind it.	12	..	..		N E	Noon. Fair weather. Lat. 23° 8′, long. 63° 37′. (Signed) C. ARCKOLL.
	P.M.					Thursday, March 16, 1809.
	1	6	0	S W	N E	P.M. First part; gale decreasing fast; middle and latter moderate, with light squalls at times.
	2	6	0			
	3	6	0			
	4	6	0			
	5	6	0			
	6	6	0			
See Chart VIII.	7	6	0			
	8	6	0			
	9	6	0			The ship pumped out dry.
	10	6	4	W S W		
	11	6	4			
	12	6	4			
	A.M.					
	1	6	4			
	2	6	4			
	3	6	4			
	4	6	4			
	5	6	4			A.M. At 5, saw three ships from the mainmast head bearing E S E.

Extract from the Log of the H. C. S. HUDDART—*continued.*

Log of the Huddart.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Thursday, March 16, 1809.
6	6	4	W S W	N E	
7	4	4			
8	4	4			
9	[illegible]	0			
10	[illegible]	0			At 10, the headmost stranger made signal; made our number, which he answered, informing us that he was the William Pitt, and the other two were the Harriet and Euphrates, which had been damaged in the gale, and leaked; informed the Pitt by telegraph that we had suffered in the gale, thrown guns overboard, and feared our cargo was much damaged.
11	2	0			
12	2	4			Lat. observed, 25° 14′ S, long. 61° 45′.
P.M.					Friday, March 17, 1809.
1	3	0	W	N E	P.M. First part, fresh breezes; middle and latter, blowing hard *and increasing;* employed drying sail and clearing ship; bent and set main-topsail.
2	4	0			
3	4	4	W ½ S	N N E	
4	4	4			
5	5	0			
6	4	4	W by S	N N W	
7	4	0			
8	4	0			
9	6	0			
10	6	0			
11	6	0			
12	6	0			
A.M.					No observation.
1	5	0			Lat. 25° 34′, long. 60°.
2	5	0			
3	5	0			
4	5	0			
5	4	0			
6	4	4			
7	4	4			
8	4	4			
9	4	4			
10	3	0			
11	2	0			
12	2	0			
P.M.					Saturday, March 18, 1809.
1	2	0	W S W	N W	P.M. Strong breezes throughout, with hard squalls at times; *guns all but two, and everything of any weight, down in the hold to stiffen the ship.*
2	2	0			
3	2	0	S W by W		
[illegible]	2	0			
5	2	0	S W	N W	
6	2	0			
7	2	0			
[illegible]	2	0	N N W		
9	2	4	N W b. W	W by S	
10	2	4			
11	2	4			
12	2	4			

Meeting the storm when recurving.

but gains below.

CHAP. VI.

Log of the Huddart.

Extract from the Log of the H. C. S. HUDDART—concluded.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Saturday, March 18, 1809.
1	3	..	N W	W by S	Lat. observed, 26° 33′ S, 50° 19′ E.
2	3	..	N W b W		
3	3	..	W N W		
4	3	..			
5	3	..	W		
6	3	..			
7	3	..			
8	3	..			
9	3	..			
10	3	..			
11	3	..			
12	3	..			(Signed) C. ARKCOLL.

Log of the William Pitt.

Extract from the Log of the H.C.S. WILLIAM PITT, Captain Charles Graham, towards St. Helena.

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	7	6	W by S	E S by S	
2	7	4			
3	7	4			
4	7	0			
5	6	4			
6	5	8			
7	6	4			
8	7	0			
9	7	0			
10	7	0			
11	7	0			
12	7	0			
A.M.					Lat. 22° 15′ S.
1	7	4			
2	8	0			
3	8	0			
4	8	0			
5	7	4			
6	7	4			
7	7	2	W by N		
8	7	4	W by S		
9	7	6			
10	4	4			
11	8	0			
12	8	0			
P.M.					Tuesday, March 14, 1809.
1	7	6	W by S	S S E	
2	7	6			
3	7	4			
4	7	4			

Extract from the Log of the H. C. S. WILLIAM PITT—*continued.*

Log of the William Pitt.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Tuesday, March 14, 1809.
P.M.					
5	7	4	W by S	S S E	
6	7	4			
7	7	4			
8	7	4			
9	7	4			
10	7	0			
11	7	0			
12	7	0			
A.M.					No Lat.
1	7	0			
2	7	4			
3	8	0			
4	8	0			
5	8	0			
6	8	2			
7	6	0			
8	3	0			
9	3	0			
10	5	4			
11	6	0			
12	5	4			
					Wednesday, March 15, 1809.
P.M.					
1	7	4	W by S	S S E	P.M. Strong gales with violent squalls, first and middle parts; latterly, fresh breezes and pleasant weather, a very high sea throughout.
2	8	0			
3	8	0	W ½ S		
4	8	0			
5	8	0			
6	8	0			
7	0	0			
8	0	0			
9	0	0	up S b. W		
10	0	0	off W		
11	0	0			
12	0	0			
A.M.					Lat. 23° 49′
1			up S by E		A.M. Weather began to clear up.
2	..	..	off S		
3			up S S E		
4	..	..	off S by E		
5	0	0			
6	0	0			
7	0	0			
8	0	0	up S E b. S		
9	0	0	off S by E		
10	0	0			
11	4	0			
12	4	4	S W ½ S		
					Thursday, March 16, 1809.
P.M.					
1	4	4	W N W	N E	P.M. *Pleasant trade* with fair weather throughout; strong south-east swell.
2	4	4			
3	4	4	W S W		
4	6	6			

See Chart VIII.

CHAP. VI.

Log of the William Pitt.

Extract from the Log of the H. C. S. WILLIAM PITT—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Thursday, March 16, 1809.
5	6	0	W by S	N E	
6	6	0			
7	6	0			
8	6	2			
9	6	2			
10	6	2			
11	6	2			
12	6	2			
A.M.					Lat. 26° 16′ S.
1	6	2		E	Noon. Fell in with the Huddart.
2	6	2			(The Harriet and Euphrates appear to be
3	6	2			in company with the William Pitt.)
4	6	0			
5	5	0			
6	5	0			
7	5	2	S W		
8	5	4			
9	6	0	S W b W ½ W		
10	6	0			
11	6	0			
12	6	0			
P.M.					Friday, March 17, 1809.
1	6	0	S W by S	E by N	
2	6	4	N W		
3	6	0			
4	4	4	W by S		
5	4	4			
6	4	0			
7	3	2	made sail W		
8	6	0		N E	P.M. Lightning in the north-west;
9	6	0			squally.
10	6	4			
11	6	4			
12	7	0			First and middle parts, fresh breezes
A.M.					and pleasant weather; *latterly freshening,*
1	7	4			*with a very confused swell.*
2	7	4			
3	6	0	W S W		
4	5	4	W ½ N		
5	5	6	W S W		
6	5	6			
7	5	0	W		
8	3	0			
9	4	0			
10	2	0			
11	2	0	W by S		
12	2	0			
P.M.					Saturday, March 18, 1809.
1	0	0	up W S W	N W	P.M. Cloudy.
2	0	0	off S W		
3	0	0			

Meeting the storm when recurving.

Log of the William Pitt.

Extract from the Log of the H. C. S. WILLIAM PITT—*concluded.*

Hour.	K.	P.	Courses.	Winds.	Remarks.
P.M.					Saturday, March 18, 1809.
4	0	0	up W S W	N W	
5	0	0	off S W		
6	2	0	S E		
7	2	0	N N W		
8	2	0	N W b N		
9	2	4			
10	2	4			
11	2	4	N W		
12	2	4	N W b W		
A.M.					Lat. 56° 5′.
1	3	0	W N W		
2	3	4			
3	3	4			
4	3	4			
5	3	4	W by N		
6	3	6			
7	3	4			
8	3	4			
9	3	4			
10	3	4			
11	0	0	up W b S		
12	0	0	off W b N		

Log of the Harriet

Extract from the Log of the H.C.S. HARRIET, Captain W. Lynch, towards England.—In *Nautical Time.*

Hour.	K.	P.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	7	4	W by S	S E by S	P.M. Hazy; fresh gales and a heavy sea; pumped ship every watch; most water 12 inches.
2	7	4			
3	7	4			
4	6	0			
5	6	0			
6	6	4			
7	6	0			
8	6	0			
9	6	4			
10	6	4			
11	6	0			
12	6	0			Noon. Fleet in company, and Euphrates and Northumberland well up towards noon.
A.M.					
1	6	0	W by S	S E by S	
[illegible]	6	4			
3	6	4			
4	6	0			
5	6	0			
6	6	0			
7	6	0			

CHAP. VI.

Log of the Harriet.

Extract from the Log of the H. C. S. HARRIET—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Monday, March 13, 1809.
8	6	0	W by S	SE by S	
9	6	6			
10	6	6			A.M. At 10, brought-to, by signal; at 10. 30, filled.
11	5	2			
12	7	4			Lat. observed, 22° 19′ S. (Signed) ALEX. RAMSAY.
P.M.					Tuesday, March 14, 1809.
1	7	4	W by S	SE	P.M. Cloudy, with small rain; fresh gales during the first and middle parts with squalls and rain, latter blowing violently, and the sea rising.
2	7	4			
3	7	4			
4	7	4			
5	7	0			
6	7	0			
7	7	4			
8	7	4			
9	7	4			
10	7	0			
11	7	0			
12	7	4			
A.M.					
1	7	0	W by S	SE	During the A.M. *saw the Admiral south one mile*, and Calcutta and Hugh Inglis SE; weather very thick, and every appearance of a violent gale; pumped ship every half hour.
2	7	0			
3	7	4			
4	7	4			
5	7	4			
6	7	4			No observation.
7	7	4			
8	7	4			(Signed) JOHN JONES JAMES.
9	7	0			
10	7	0			
11	5	0			
12	5	0			
P.M.					Wednesday, March 15, 1809.
1	6	0	W by S	SSE	P.M. Thick mist; blowing without intermission till 4 A.M. most violently, when it moderated.
2	6	0			
3	6	0			
4	6	0			
5	6	0			
6, 7, 8, 9	..	..	up SW off WbS	SE	
10, 11	..	..	up SSW off SW	ESE	
12	..	..	up S off SSW	E	
A.M.					
1		..	ditto		
2, 3	..	..	up SSE off SbW		

Log of the Harriet.

Extract from the Log of the H. C. S. HARRIET—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Wednesday, March 15, 1809.
4			up S E	E N E	A.M. At 4, the pumps sucked for the first time since 8 P.M.
5	..	..	off S b E		At 5, brought-to, finding it impossible to run; the ship labouring excessively, and the sea washing over all; kept both pumps going, but from the immense quantity of water which got between decks down the hatchways could not keep her clear, and most part of the night we had two feet and two and a half in the well; all hands employed throughout the night at the pumps, and in attending the scuppers on the lower decks.
6	0	0			
7	0	0			At daylight, observed only the Euphrates in sight; kept lying-to till 7 A.M., when no other ship appearing bore up on a W by S course, and made her signal to follow.
8	6	0			
9	6	0			At 9, were joined by the William Pitt.
10	6	0			Towards noon the swell abating, and the weather bearing the appearance of continuing moderate.
11	6	0			
12	6	0			No observation.
					(Signed) ALEX. RAMSAY.
P.M.					Thursday, March 16, 1809.
1	6	0	W by S	W by N	P.M. Hazy; breeze steady; repairing the ravages of the late gale.
2	6	0			
3	6	0			
4	6	4			
5	6	0			
6	6	0			
7	7	0			
8	6	4			
9	7	0			
10	6	0			
11	6	0			
12	6	0			
A.M.					
1	5	4	W by S	W by N	
2	5	4			
3	5	4			
4	4	0			
5	5	0			
6	6	4			
7	6	4			
8	6	4			
9	7	0			
10	7	0			
11	5	4			
12	6	4			(Signed) JOHN JONES JAMES.

Hove-to, and thereby dropped out of the storm.

CHAP. VI.

Log of the Harriet.

Extract from the Log of the H. C. S. HARRIET—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Friday, March 17, 1809.
1	6	4	W by S		
2	6	4			
3	6	4			
4	6	4			
5	6	0			
6	6	0			
7	7	4			
8	7	4			
9	7	0			
10	6	0			
11	5	4			
12	5	4			
A.M.					
1	5	0	W by S		
2	5	0			
3	5	0			
4	4	0			
5	3	4			
6	3	4			
7	3	0			
8	2	0			
9	2	0			
10	2	0			
11	2	0			
12	2	0			
P.M.					Saturday, March 18, 1809.
1	1	0	W by S		
2	1	0	W N W		
3	1	0			
4	1	4	S W		
5	1	4			
6	1	4			
7	1	4	N N W		
8	1	4			
9	2	0			
10	2	0			
11	2	0			
12	2	0			
A.M.					
1	2	0			Noon. Lat. 26 9′ S.
2	2	0	N W		
3	2	0			
4	2	0	W N W		
5	2	0			
6	3	0	W by N		
7	3	0			
8	3	4			
9	3	4			
10	3	4			
11	2	0			
12	2	0			

Extract from the Log of the H.C.S. Euphrates, Captain Philip Herbert, towards St. Helena.—In *Nautical Time*.

Log of the Euphrates.

Hour.	K.	F	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	7	0	W by S	S E	P.M. Strong breezes, squally throughout; pumped ship twice in twenty-four hours.
2	7	0			
3	7	0			
4	7	0			Lat. observed, 22° 18′ S.
5	7	0			
6	7	0			
7	6	4			
8	6	4			
9	7	0			
10	7	0			
11	7	0			
12	7	0			
A.M.					
1	6	4	W by S	S E	
2	6	4			
3	7	0			
4	7	0			
5	7	0			
6	7	0			
7	6	0			
8	6	0			
9	6	0			(Signed) JOHN GILLESPIE.
10	3	0	Hove-to		
11	5	0			Tuesday, March 14, 1809.
12	7	0			Hazy, with frequent squalls and rain; carried away the foot-rope of the fore-topsail.
P.M.					
1	7	0	W by S	S S E	P.M. First and middle parts thick hazy weather, with frequent hard squalls, latter increasing to a heavy gale with hard rain, the ship labouring much; shipped a great deal of water.
2	7	0			
3	7	0			
4	7	0			
5	7	0			
6	7	0			
7	7	0			
8	7	0			
9	7	0			
10	6	4			
11	6	0			
12	6	0			
A.M.					
1	6	4	W by S	S S E	A.M Handed the fore and mizen-topsails and lowered the gaff and top-gallant-yards; pumped the ship every two hours; no ships in sight.
2	7	0			
3	7	0			
4	7	0			
5	7	0			
6	7	0			No observation.
7	7	0			
8	7	0			
9	7	0			
10	6	0			
11	6	0			
12	6	0			(Signed) GEORGE NORRIS.

CHAP. VI.

Log of the Euphrates.

Extract from the Log of the H. C. S. EUPHRATES—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
P.M.					
1	4	0	S W	S S E	P.M. A hard gale with heavy squalls and rain; struck the fore and main top-gallant-masts and got the jib-boom in. During the gale the ship laboured much & made a great deal of water in her upper works; shipped a great quantity down her hatchways; kept the pumps constantly going and baleing the water from the middle deck with buckets.
2	5	0			
3	4	0			
4	3	4			
5	2	0	S S W to W		At 5, one of the long 12-pounders broke adrift, which we were obliged to heave overboard, and several empty water-butts.
6	2	0			
7	2	0			
8	2	0			At 8, split the foresail.
9	2	0			
10	2	0			
11, 12	2	0	up S off S W		Midnight. Split the mainsail.
A.M.					
1, 2	2	0	ditto	S S E	A.M. At 1, under bare poles, with heavy squalls and tremendous high sea.
3, 4, 5	2	0	W to W S W		Bent the bt. foresail.
6	2	0			
7	4	0	W by S		
8	4	0			
9	4	0	....	E S E	Noon. In company with the William Pitt and Harriet; the Admiral not in sight.
10	5	4			
11	5	4			Lat. observed, 23° 55′ S.
12	5	4			(Signed) JOHN GILLESPIE.
					Thursday, March 16, 1809.
P.M.					
1	4	4	W S W	E	P.M. Moderate breezes, mostly clear, a very heavy swell, and the ship rolling much; out reef in the fore and main-top-sail; drying some sails; out all reefs in the main-topsail.
2	5	0			
3	5	0	W by S		
4	5	0			
5	5	0			
6	5	0			Lat. observed, 25° 4′.
7	5	2			
8	5	0			
9	5	0			
10	5	0			
11	5	0			
12	5	2			
A.M.					
1	5	4	W by S	E	
2	5	4			
3	5	4			
4	5	4			
5	5	4			
6	5	4			
7	5	4			
8	5	4			
9	5	4			
10	5	4			
11	5	4			(Signed) GEORGE NORRIS.
12	5	4			

All reefs out.

Log of the Euphrates.

Meeting the storm when recurving.

Extract from the Log of the H. C. S. EUPHRATES—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Friday, March 17, 1809.
P.M. 1	5	4	W by S	E N E	P.M. At 6, increasing breeze and cloudy.
2	5	4			
3	5	4			
4	5	4			
5	5	4			
6	6	4			
7	6	4			
8	7	0			
9	7	0			
10	6	4			
11	7	0			
12	6	4	....	N E	
A.M. 1	7	0	W by S		
2	7	0			
3	7	0	....	NE by N	A.M. At 3, strong breeze.
4	7	0			
5	6	4			
6	5	0			
7	5	0	W		
8	3	0			
9	3	0			
10	2	0			At 10, increased to a gale.
11	1	0	S W		General Remark.
12	1	0			First part a moderate breeze, and fair; middle, strong breezes; and latter, strong gale with much sea. Lat. 26° 21′. (Signed) JOHN GILLESPIE.
					Saturday, March 18, 1809.
P.M. 1	1	4	S W		P.M. Hazy, with rain; lying-to for the Commodore.
2	1	4			
3 } 4 }	0	0	up W S W off S W	S W	First part a fresh breeze; latter part squalls from the S W.
5	3	0	E S E		Lat. observed, 26° 7′.
6	3	0			
7	3	0			
8	3	0			
9	3	0	S S W		
10	3	0	N W ½ N		
11	3	0			
12	3	0			
A.M. 1	4	0	N by E		
2	4	0			
3	3	4	N W b W		
4	3	4			
5	3	0			
6	3	0			
7	3	0			
8	3	0			
9	3	0			
10	3	0			
11 } 12 }	0	0	up W b S off W N W		(Signed) GEORGE NORRIS.

CHAP. VI.

The following are the logs of the Northumberland, Indus, and Sovereign, which were the next ships to get out of the storm after the Huddart, William Pitt, Harriet, and Euphrates, and near the border of the storm.

Log of the Northumberland.

Extract from the Log of the H. C. S. NORTHUMBERLAND, Captain John Robertson Franklin.—In *Nautical Time.*

See Chart VIII.

Hour	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	6	6	W by S	E by S	P.M. A strong breeze, with hard squalls and rain throughout.
2	6	6			
3	6	6			
4	6	6			
5	6	0			
6	6	0			
7	6	0			
8	6	0			
9	7	0			
10	7	0			
11	6	4			
12	6	4			
A.M.					
1	6	4	W by S	E by S	
2	7	0			
3	7	0			
4	7	0			
5	7	0			
6	6	4			
7	6	4			
8	6	4			
9	6	4			
10	7	0			
11	7	0			
12	7	0			Lat. observed, 22° 15′ S., long. 65° 23′. (Signed) H. KEMPT.
P.M.					Tuesday, March 14, 1809.
1	7	0	W by S	E by S	P M. First part, a strong breeze, with frequent hard squalls and rain; middle part, gale increasing; latter part, blowing a hard gale, with violent hard squalls and constant rain.
2	7	0			
3	7	0			
4	7	0			
5	7	4			
6	7	4			
7	7	0			At 7, handed the mainsail and close-reefed the topsails.
8	7	0			
9	7	0			
10	7	2			No observation.
11	7	4			
12	7	6			

Log of the Northumberland.

Extract from the Log of H. C. S. NORTHUMBERLAND—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Tuesday, March 14, 1809.
1	7	4	W by S	E by S	
2	7	4			
3	6	4			
4	5	4			
5	5	4			
6	5	4			
7	5	4			
8	5	4			
9	5	0			
10	5	0			
11	5	0			
12	5	0			Lat. 22° 49′ S, long. 62° 49′. (Signed) HENRY J. OLIVER.
P.M.					Wednesday, March 15, 1809.
1	7	0	W by S	ESE	P.M. A strong gale till 10, with constant rain and very severe squalls; middle more moderate; latter quite moderate, and the sea going down fast.
2	7	0			
3	7	0			
4	7	0			
5	7	0			At 5, thinking it not prudent to continue under sail, brought-to under the mizen-stay-sail, the gale increasing and the sea getting very high.
6, 7, 8	0	0	up S off SSW	ESE	Hove-to.
9, 10, 11, 12	0	0	ditto		During the gale, washed away the side of both lower quarter-galleries. Noon. Up top-gallant-masts.
A.M.					
1, 2, 3	0	0	up S off SSE		
4					
5, 6	0	0	ditto		
7	5	0			At daylight, only the Lord Eldon in sight; it being moderate, made the signal 53, and bore up. Bore up.
8	6	0			
9	6	4			Pumped the ship every watch during the gale.
10	6	4			
11	6	4			Lat. observed, 23° 48′ S, long. 61° 40′.
12	6	4			(Signed) H. KEMP.
P.M.					Thursday, March 16, 1809.
1	6	0	W by S	E by N	P.M. A moderate decreasing breeze throughout, with hazy weather; water getting smooth.
2	6	0			
3	6	0			
4	6	0			
5	5	4			
6	5	4			Bent great storm mizen-staysail.
7	5	0			Crossed top-gallant-masts, shifted the mainsail with the new one, ditto fore-topmast-staysail, and fore-top-gallant-sail with ditto.
8	5	0			
9	5	0			
10	5	0			
11	5	0			
12	5	0			

CHAP. VI.

Extract from the Log of H.C.S. NORTHUMBERLAND—*continued.*

Log of the Northumberland.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Thursday, March 16, 1809.
1	5	0	W by S	E by N	
2	5	0			
3	5	0			
4	5	0			
5	5	0			A.M. Employed drying wet sails, &c.
6	5	0			
7	5	0			Pumped ship, eleven inches.
8	6	0			
9	6	0			
10	6	0			*Out all reefs.*
11	6	0			
12	6	0			Lat. observed, 24° 43′ S, long. 59° 33′. (Signed) H. J. OLIVER.
P.M.					Friday, March 17, 1809.
1	6	0	W by S	E N E	P.M. First part, a moderate breeze, increasing; middle, blowing fresh, with squalls; latterly, a large sea getting up, which makes the ship plunge deep.
2	6	0			
3	5	4			
4	6	0			
5	6	4			Pumped ship, eleven inches.
6	6	4			
7	6	4			In first reef.
8	7	0			
9	7	0			
10	7	0			Pumped ship, eleven inches.
11	6	4			
12	6	4			
A.M.					
1	6	4	W by S	E N E	A.M. Shifted the main-topsail with the new one, and *in three reefs* ditto; close reefed fore topsail
2	6	0			
3	6	0			
4	5	4	..	N E	Handed mizen-topsail; in three reefs fore and main.
5	4	4			
6	4	4			In company with the Lord Eldon.
7	4	4	W by S ½ S		
8	4	4	W by S	N N W	Pumped ship, eleven inches.
9	4	4			
10	4	4			
11	3	4			
12	3	4			Lat. observed, 26° S, long. 57° 26′. (Signed) H. KEMP.
P.M.					Saturday, March 18, 1809.
1	2	0	S W by W	N W	P.M. In the first part, a moderate breeze from the N, a *very heavy swell from the* S W; latterly, a fresh breeze from the S and cloudy weather.
2	1	4			
3	1	0			Close-reefed and handed fore-topsail.
4	1	0			
5	1	0	S S W		
6	1	0	N N W		
7	1	0			
8	1	0			Pumped ship, eleven inches.
9	2	0			At 9, saw two ships, bearing S W.

Approaching the storm again.

Wind NW, swell S W.

Log of the Northumberland.

Extract from the Log of H.C.S. NORTHUMBERLAND—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Saturday, March 18, 1809.
P.M.					
10	2	4	N N E	N W	standing to the southward; supposing
11	2	4	S E by S		them to be part of our fleet, bore up and
12	3	4			made the signal to speak; the commanding officer spoke them at midnight; they proved to be the Indus and Sovereign; made the signal to wear.
A.M.					
1	2	0			A.M. Scraped and cleansed ship below.
2	2	4			
3	3	0	W N W	S W b S	Out third reefs.
4	3	4			
5	3	4			
6	3	6			Pumped ship, eleven inches.
7	4	0			
8	4	2			
9	5	0			
10	5	4			Out second reefs.
11	5	4	W by N		In company with the Lord Eldon, Sovereign, and Indus.
12	5	4			Lat. (by indiff. obs.) 25° 45′ S, long. 56° 44′.
					(Signed) H. J. OLIVER.
					Sunday, March 19, 1809.
P.M.					
1	6	6	W by N	S S W	P.M. A fresh breeze, with squalls and
2	7	0			rain in the first part; latter, moderate.
3	7	0			
4	6	4	....	S by E	
5	6	0			
6	6	0			
7	6	0			Signal to steer W.
8	6	0			
9	6	0			
10	6	0			
11	6	0			
12	6	0			
A.M.					
1	6	0	W by N	S by E	A.M. The Sovereign informed us that,
2	5	4			having leaked and laboured so much
3	5	4			during the gale, she was under the necessity of throwing overboard saltpetre.
4	5	4			
5	5	0			
6	4	4			At daylight, the Lord Eldon and Indus
7	4	4			just in sight, astern; shortened sail.
8	4	4			
9	4	4			
10	4	0			
11	4	0			
12	0	0			Noon. Wore and stood towards the Indus. Lat. observed, 26° 2′ S.
					(Signed) H. KEMP.

CHAP. VI.

Log of the Northumberland.

Extract from the Log of H. C. S. NORTHUMBERLAND—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 20, 1809.
1	3	4	E	S S E	P.M. First and middle parts moderate;
2	1	4	W		latter, little wind and fine weather.
3	2	0			At 3, the Indus made the signal to speak,
4	4	0			and informed us she laboured so much
5	4	0			during the night and was unable to carry
6	4	0	....	S	sail, and under the necessity to throw
7	4	0			overboard saltpetre.
8	4	0			
9	4	0			
10	3	4			
11	3	0			
12	2	6			
A.M.					
1	2	0	W	S	
2	1	4			
3	1	4			
4	1	4			
5	1	4			
6	1	4			
7	1	0			
8	1	0			A.M. Out all reefs.
9	1	0			
10	1	0			Bore up to join the Indus.
11	1	0			
12	2	4			Lat. observed, 25° 51′ S. (Signed) H. J. OLIVER.
P.M.					Tuesday, March 21, 1809.
1	1	4	N N W		
2	1	4			
3	2	2			
4	2	4			
5	2	2			
6	2	0			
7	1	4			
8	1	4			
9	1	4			
10	1	4			
11	1	4			
12	1	4			
A.M.					
1	1	0	S W		
2	2	4			
3	3	0			
4	3	4			
5	2	4			
6	2	4			
7	2	4			
8	2	4			
9	2	6	S S W		
10	2	6			
11	3	0			
12	2	6			

Extract from the Log of H. C. S. NORTHUMBERLAND—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Wednesday, March 22, 1809.
P.M.					
1	1	4	S S W.		
2	1	0			
3	1	0			
4	1	4			
5	1	0			
6	1	4			
7	1	0			
8	1	0			
9	2	0	W by S		
10	2	0			
11	2	0			
12	2	0			
A.M.					
1	2	0	W by S		
2	2	0			
3	2	0			
4	2	0			
5	2	0			
6	2	0			
7	2	0			
8	2	0			
9	1	4			
10	1	4			
11	1	0			
12	1	0			
					Thursday, March 23, 1809.
P.M.					
1	1	0	W by S		
2	1	0			
3	1	0			
4	3	0	W S W		
5	3	0			
6	3	4			
7	3	6			
8	3	6			
9	3	4			
10	4	0			
11	4	0			
12	3	4			
A.M.					
1	2	4	W S W		
2	2	0			
3	2	0			
4	2	0			
5	2	4			
6	2	4			
7	1	4			
8	1	4			
9	1	4			
10	1	0			
11	1	0			
12	1	0			

CHAP. VI.

Extract from the Log of H. C. S. NORTHUMBERLAND—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
Log of the Northumberland.						Friday, March 24, 1809.
	P.M.					
	1	2	4	W S W	S S E	P.M. Throughout light breezes, with fine pleasant weather.
	2	2	4			
	3	2	4			
	4	2	4			
	5	3	0			
Meets the Nereide;	6	3	0			At 6, discovered six sail, bearing E S E, standing to the westward; made the signal for ditto.
	7	3	0			
	8	3	4			
	9	3	0			At daylight, two of them in sight from the deck, bearing E N E; made the signal to make all possible sail, and hove-to to let the Sovereign come up.
	10	3	4			
	11	2	6			
	12	2	4			Noon. Discovered the signal, No. 9, flying from the headmost ship, and making out several of the ships to be part of our fleet that separated on the 15th; and, perceiving one of them under jury main and mizen masts, stood towards them.
	A.M.					
	1	1	0	WbyS½S	S by E	
	2	1	0			
	3	1	4			
	4	2	0			
	5	2	0			
	6	2	0			
	7	..	..	not entered		
	8					
	9					
	10					
	11					
	12					A.M. Lat. observed, 26° 50′ S.
						(Signed) H. J. OLIVER.
						Saturday, March 25, 1809.
	P.M.					
	1	1	4	E N E	Variable	P.M. Light winds and variable throughout.
	2	1	0	W by N		
	3	1	0			
	4	1	0			
	5	1	0	E by N		
and the Huddart, Pitt, Harriet, Euphrates.	6	1	0			At sunset, about five miles from the ships, made them out to be the William Pitt, Huddart, Harriet, Euphrates, and the American; the crippled ship a frigate.
	7	1	0			
	8	1	0			
	9	1	4			
	10	1	4			
	11	1	4			
	12	1	4			
	A.M.					
	1	1	0	W by S	Variable	
	2	1	0			
	3	1	0			
	4	1	0			
	5	1	0			
	6	1	0			At daylight, sent a boat on board; she proved to be H.M. frigate La Nereide, left
	7	1	0			

Log of the Northumberland.

Nereide crossed storm's centre.

Extract from the Log of H. C. S. NORTHUMBERLAND—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Saturday, March 25, 1809.
A.M. 8	1	0	W by S	S S E	the Cape on the 21st February, to cruise off the Isle of France; she lost her main and mizenmasts in a hard gale on the 16th, a little to the south and westward of our fleet. After the gale blowing most furiously from the S E *it left little wind for half an hour, and then set in as violently from the N W*, which caused the heavy westerly swell we experienced on the 17th; she is bound to False Bay to refit; received the order of sailing from her.
9	1	0			
10	1	0			
11	0	4			
12	1	0			Lat. observed, 27° 5′ S.
					(Signed) H. KEMP.

Log of the Indus.

Extract from the Log of the H. C. S. INDUS, Captain G. Wilden, towards St. Helena.—In *Nautical Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Monday, March 13, 1809.
P.M. 1	6	0	W by S	S S E	
2	6	2	....	fair.	
3	7	0			
4	7	0	....	S	P.M. Pumped ship; a squally trade throughout; moderating towards noon.
5	6	6			
6	6	6			
7	7	0			
8	7	0			
9	6	4			
10	7	0			
11	7	0			
12	7	0			People making robands for the new mainsail.
A.M. 1	6	4	W by S	S	A.M. 1 to 4, squally and rain.
2	6	4			
3	6	4			
4	6	4			
5	6	6			
6	6	6			
7	6	6			
8	6	4			
9	6	4			
10	6	4			
11	6	4			Course, S 76° W, distance 160 miles.
12	6	4			Lat. observed, 22° 15′ S, long. 65° 23′.
					(Signed) HENRY BEEHER.

CHAP. VI.

Log of the Indus.

Extract from the Log of the H. C. S. INDUS—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
	P.M.					Tuesday, March 14, 1809.
	1	6	6	W by S	ES by S	
	2	6	6			
	3	6	6			P.M. At 3, squally; first and middle
	4	6	6			parts, a fresh trade, with frequent squalls
	5	6	4			and rain; latter, increasing to a gale, with
	6	6	4			a very heavy sea.
	7	6	6			Pumped ship.
	8	6	6			
	9	7	0	W N W		Handed the mizen-topsail.
Lightened ship.	10	6	2	....	squally and rain.	At 10, the ship labouring very much, hove overboard two 6-pounder guns, two kedge and one stream anchor, and all the
	11	6	4	W		lumber of the forecastle, to ease the ship.
	12	6	4			Pumped ship; Commodore not in sight.
	A.M.					
	1	6	6			
	2	7	0	W by S		
	3	7	0		ditto	
	4	7	0			
	5	6	6			
	6	6	4			A.M. At 6, set the main-topsail, sent
	7	5	0			down top-gallant-yards, & struck the masts, close-reefed the fore and main topsails.
	8	5	0			Furled the fore-topsail and mainsail, and reefed the foresail; in setting it, it split; furled it; got in the jib and driver booms.
	9	4	4			Three ships in sight.
	10	3	6			The sea running very high, and making
	11	3	4			a fair breach over us.
	12	3	4			Course, S 71°, W, distance, 146 miles. Lat. observed, 22° 55′, long. 63° 9′.
						(Signed) T. W. ALDHAM.
						Wednesday, March 15, 1809.
	P.M.					
Hurricane	1	2	6	W S W	S by E	P.M. The ship labouring so extremely
	2	2	6			as seriously to endanger the *****, and
	3	2	6			having much water below decks.
	4	2	6			At 4, hove overboard 300 bags of salt-
	5	2	4			petre, it then blowing a hurricane; two
	6	2	2			ships in sight.
	7	2	6	S W		
	8	2	6			
on the	9	2	6			Heavy gale.
border of	10	3	0	S by W		
storm.	11	2	6			General Remarks.
	12	2	4		E	First and middle parts, a fresh gale and rain at times; latter more moderate; towards noon a pleasant breeze. These twenty-four hours the ship labouring much, shipped a great deal of water, and kept the bilge-pump going all night. Pumped ship every two hours.

Log of the Indus.

Extract from the Log of the H. C. S. INDUS—*continued.*

Hour.	K	F.	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
A.M. 1	2	4	S by W	E	At daylight saw the Sovereign bearing E N E; at 10 A.M. joined her.
2	2	4			A.M. At 2, the yawl was washed away from the starboard quarter.
3	3	0			
4	3	0			Set the fore and mizen topsails close-reefed, and foresail.
5	3	0			
6	3	4	W by N		
7	4	4			
8	4	4			
9	4	0			
10	4	0	W		
11	4	4			
12	4	0			Noon. Out third and fourth reefs of fore and main-topsails. Course, S W 74°, distance 74 miles. Lat. observed, 23° 37′ long. 62° 12′. (Signed) H. BEEHER.
					Thursday, March 16, 1809.
P.M. 1	4	6	W N W	N E by E	P.M. Cloudy; a pleasant breeze and fine weather throughout.
2	5	0			
3	5	4			
4	5	6			
5	5	4			
6	5	4	W ½ S		
7	5	0			Pumped ship.
8	5	0	W		
9	5	2			Found the rigging very much damaged, and the sails in the sail-room wet.
10	5	4			
11	5	4			
12	5	4			
A.M. 1	5	4			A.M. *Out all reefs of topsails*, and fidded top-gallant-masts; *loosed all sails to dry.*
2	5	4			
3	5	4			
4	5	4			Swayed up the top-gallant-yards, and out all reefs clear.
5	5	4			The Sovereign in company.
6	5	4			
7	5	4			
8	5	4			
9	6	0			
10	6	4			
11	6	4			
12	6	4			Course, W 74° S, distance 133 miles. Lat. observed, 24° 4′ S, long. 59° 50′. (Signed) T. W. ALDHAM.
					Friday, March 17, 1809.
P.M. 1		0	W ½ S	E N E	P.M. Moderate and fair.
2		0			
3		0			
4		0			

Loosed sails.

CHAP. VI.

Log of the Indus.

Meeting the storm recurring.

Extract from the Log of the H. C. S. INDUS—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Friday, March 17, 1809.
P.M.					
5	5	0	W ½ S	E N E	
6	5	0			Lightning in the N W.
7	5	0			
8	5	0			In first reefs of topsails.
9	5	0			Pumped ship.
10	5	2			
11	5	4			First part, moderate and fair; middle,
12	5	4			cloudy, with light passing clouds and variable; latter, a fresh breeze, *with a* N W *swell.* The ship labouring much, rolling very heavy, and shipping a great quantity of water throughout.
A.M.					
1	5	4	W by S	Variable	A.M. Cloudy, and small rain.
2	5	6			
3	6	0			
4	5	6	W S W	ditto	
5	5	4			
6	5	4	S W b W		
7	5	4			Pumped ship.
8	5	4			
9	5	4			
10	5	4			
11	5	4		W N W	
12	5	2			
					Course, S W, distance 128 miles. Lat. observed, 25° 29′ S, long. 57° 53′. (Signed) H. BEEHER.
					Saturday, March 18, 1809.
P.M.					
1	3	4	S W	Variable	
2	3	4			P.M. Cloudy.
3	3	0	S S W		
4	3	0			Pumped ship.
5	3	0	S by W		
6	3	0			
7	2	0			*In second and third reefs* of fore-topsail,
8	2	0			and two ditto main.
9	2	0			
10	2	0			Saw two strange sail.
11	2	0			First and middle parts, a moderate breeze
10	2	0			and variable; latter, pleasant breeze, with passing showers.
A.M.					
1	2	0	N W b N		A.M. At 1, joined company the H.C.
2	2	4	N N W		ships Northumberland and Lord Eldon.
3	4	0	W N W		
4	4	4			First part, a heavy swell, the ship
5	4	0			labouring very much.
6	4	0			
7	4	0			
8	4	0			
9	4	0			Course, S 66° W, distance 76 miles.
10	4	0			Lat. observed, 26° 43′ S.
11	4	0			
12	4	0	W by N		(Signed) T. W. ALDHAM.

Log of the Indus.

Extract from the Log of the H.C.S. INDUS—*concluded*.

Hour.	K.	F	Courses.	Winds.	Remarks.
P.M.					Sunday, March 19, 1809.
1	5	0	W N W	S W	P.M. First and middle part, fresh breeze and squalls, with rain; latter, a pleasant breeze and fine weather, *very heavy swell.*
2	5	0			
3	5	0	W by N		
4	5	0			
5	3	4			
6	3	4			
7	4	4	W		
8	3	0	W by N		
9	3	4			
10	3	4			
11	3	4			
12	3	6			
A.M.					
1	4	0			
2	4	0	W		
3	4	4			
4	4	4			
5	4	0			
6	4	4			
7	4	6			
8	4	6			
9	4	6			
10	4	6			
11	4	6			
12	5	0			Course, S 81° W, distance 105 miles. Lat. observed, 26° S, long. 57° 53′.
					(Signed) H. BERHER.

Storm moving towards [illegible]

Log of the Sovereign.

Extract from the Log of the H. C. S. SOVEREIGN, Captain Alexander Campbell, towards St. Helena.—In *Nautical Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	6	6	W by S	S S E	P.M. Fresh trade, with frequent squalls and rain throughout.
2	7	0			
3	6	6			
4	6	4			
5	6	4			
6	6	4			
7	6	0			
8	6	0			Close-reefed main-topsail.
9	7	0			
10	7	2			
11	7	4			
12	7	6			

CHAP. VI.

Log of the Sovereign.

Extract from the Log of the H.C.S. SOVEREIGN—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Monday, March 13, 1809.
A.M. 1	7	4	W by S	SSE	A.M. At 1, shifted the fore-topmast staysail, with a new one; sailmaker repairing the fore-topmast staysail that was split.
2	7	4			
3	7	4			
4	7	4			
5	6	4			
6	6	4			
7	7	0			
8	7	0			
9	6	6			
10	4	0			
11	6	6			Pumped ship every four hours.
12	7	0			Lat. observed, 22° 18′ S. (Signed) JOHN FREEMAN.
					Tuesday, March 14, 1809.
P.M. 1	7	4	W by S	S by E	P.M. First and middle parts, strong breezes, with squalls and rain; latter part, a fresh gale, with hard squalls and rain; ship rolling very much, and shipped a great deal of water over all and through the ports, her top side working very much.
2	7	6			Out fourth reef main-topsail.
3	7	4			Struck mizen top-gallant-mast, handed mainsail.
4	7	6			
5	6	6			
6	6	6			Squally and rain; close-reefed main-topsail.
7	6	6			
8	7	0			
9	7	4			
10	7	4			
11	7	4			
12	7	4			
A.M. 1	7	4			A.M. Admiral burnt a blue light; handed mainsail.
2	7	4			
3	7	0			
4	7	4		S E	
5	7	4			Squally, with rain; reefed the foresail.
6	7	0			
7	6	6			
8	6	4			Handed the fore-topsail.
9	6	0			
10	6	0			At 10, a heavy sea struck the larboard quarter-gallery and stove it in; got it secured before much water got in; down top-gallant-yards, and struck the masts.
11	3	0			Pumped ship every hour during the last twenty-four hours; latterly, constantly at the pumps.
12	3	0			Noon. Only three ships in sight. No observation. (Signed) N. BENT.

Extract from the Log of the H. C. S. SOVEREIGN—*continued*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
P.M.					
1	2	0	up S W	[illegible]	P.M. Hard gales, with rain in the first and middle parts; *latter, more moderate and fine weather.* Ship pitching, rolling, and straining very much; carried away the headrails, and washed away the waist bulwarks; making a great deal of water; hands constantly at the pumps; a great deal of water on the gun-deck.
2	2	0	off W		
3	3	0	up S off		
4	2	0	S W		
5	1	4	up S b E		
6	1	4	off S b W		
7	1	4	up S S E		
	1	4	E off		
8	1	4	S by E		
9	1	4		NE by N	
10	1	4	up S E		
11	1	4	off S b E		
12	1	4			
A.M.					
1	1	4			At daylight, one ship in sight, which proved to be the Indus.
2	1	4	up SEbE		
3	1	4	off SEbS		
4	1	0			
5	1	0	up SEbE		
6	1	0	off SEbS		
7	4	0			
8	4	4	W S W		
9	4	4			
10	5	0	W by S		
11	5	0			
12	5	0			Noon. In company with the Indus. Lat. observed, 23° 54′ S. (Signed) JOHN FREEMAN.
					Thursday, March 16, 1809.
P.M.					
1	5	0	W N.W	N E	P.M. Pleasant breezes and fair weather throughout; got the jib-boom out and set the jib. Set mizen-topsail.
2	6	0			
3	5	4	N W b W		
4	5	2			
5	5	4	W N W		
6	5	4			
7	5	4			
8	5	0			
9	5	0	W		
10	5	2			
11	5	4			
12	5	4			
A.M.					
1	5	4			A.M. Swayed the top-gallant-masts an end, and crossed the yards; out reef of foresail, and third and fourth reef main and fourth ditto fore topsails; *set the mainsail, and loosed small sails to dry.* Pumped ship every half hour.
2	5	4			
3	5	4			
4	5	4			
5	5	0			

Log of the Sovereign.

On port tack,

coming up,

and getting out of storm.

Loosed small sails.

CHAP. VI.

Log of the Sovereign.

Extract from the Log of the H.C.S. SOVEREIGN—*continued*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Thursday, March 16, 1809.
6	5	0	W	N E	
7	5	0			
8	4	6			
9	5	0			
10	5	4			Lat. observed, 24° 7′ S.
11	5	2			
12	5	0			(Signed) N. BENT.
					Friday, March 17, 1809.
P.M.					
1	5	0	W ½ S	N E	P.M. Moderate breeze and cloudy weather, with a heavy head sea; on ship pitching bowsprit and spritsail-yard in, got the jib-boom and spritsail-yard in; hands constantly at the pumps; found the water gaining on the pumps; came to the determination (by the advice of my officers and petty officers) of throwing overboard some dead weight from forward; employed clearing away to the saltpetre; threw overboard sixty bags; informed the Indus per telegraph that we could not carry sail on that account.
2	5	0			
3	5	0			
4	5	0			
5	5	4			
6	6	0			In third reef main-topsail, and reefed the foresail.
7	5	4			
8	5	0			
9	5	4			
10	6	0			
11	6	6			
12	6	6			
A.M.					
1	5	4			A.M. At 2, close-reefed fore-topsail.
2	5	4			
3	5	0			
4	6	0			
5	5	0			
6	5	0			
7	4	4			
8	5	0			
9	6	4	SW b W		Out fourth reef fore and third ditto main topsail.
10	6	4			
11	6	6			
12	6	6	S W		Lat. observed, 25° 30′ S. (Signed) JOHN FREEMAN, A. CAMPBELL.
					Saturday, March 18, 1809.
P.M.					
1	4	0	S W	W by N	P.M. Moderate breezes, cloudy weather, with a very heavy head sea.
2	3	4		Cloudy.	
3	3	4	S S W		
4	3	4			
5	3	0			
6	3	0			
7	2	4			

Log of the Sovereign.

Extract from the Log of the H.C.S. SOVEREIGN—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Saturday, March 18, 1809.
8	2	4	S	W by N	
9	2	0			
10	2	0			
11	2	0			
12	2	0			Spoke the Northumberland, and in company with the Lord Eldon.
A.M.					
1	3	0			
2	3	4	W S W		
3	3	4			
4	3	4			
5	3	4	W		
6	3	4			
7	3	4	W N W		
8	4	0			
9	6	0	W by N		
10	6	0			
11	6	0			
12	5	0			No observation.
					Lat. on the 19th at noon, 25° 59′ S.
					(Signed) N. BENT.

The two next logs are those of the East India Company's ships Sir William Bensley and Earl St. Vincent, the two ships which scudded until they came near the centre of the storm on the 17th, when the one lay-to for twenty-one hours, and the other for thirteen.

Log of the Sir William Bensley.

Extract from the Log of the H. C. S. SIR WILLIAM BENSLEY, Captain G. Hooper.—In *Nautical Time.*

Hour	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	6	0	W by S	S S E	P.M. Hazy and rain; fresh trade and squally; swell from S E.
2	6	0			
3	5	4			
4	5	0			
5	5	0			
6	5	0			
7	5	2			
8	5	4			
9	6	0			

CHAP. VI.

Log of the Sir William Bensley.

Extract from the Log of the H.C.S. Sir Wm. Bensley—*continued.*

	Hour.	K.	F.	Courses.	Winds.	Remarks.
						Monday, March 13, 1809.
	P.M.					
	10	6	0	W by S	S S E	
	11	6	0			
	12	6	0			
	A.M.					
	1	6	0	W by S	S S E	
	2	6	0			
	3	6	0			
	4	6	0			
	5	6	0			
	6	6	0			
	7	6	4			
	8	6	4			
	9	6	4			
	10	6	0			
	11	4	0			
	12	6	4			Lat. 22° 19′ S, long. 65° 40′ E.
						Tuesday, March 14, 1809.
	P.M.					
In front of storm.	1	6	0	W by S	S S E	P.M. First and middle parts, strong breezes, with constant squalls and rain; latter, hard gales and heavy squalls; much rain.
	2	6	0			
	3	6	0			
	4	6	6			
	5	6	2			
	6	6	0			
	7	6	0			
	8	6	0			
	9	6	0			
	10	6	0			
	11	5	6			
	12	5	6			
	A.M.					
	1	5	6	W by S	S S E	
	2	5	4			
	3	5	4			
	4	6	0			
	5	6	2			
	6	6	2			
	7	6	2			
	8	6	0			
	9	6	0			
	10	6	0			
Lost convoy.	11	5	0			Noon. Not a ship in sight, the weather so very thick.
	12	5	0			Lat. 22° 46′ S, long. 63° 5′ E. No observation.
						Wednesday, March 15, 1809.
	P.M.					
	1	6	0	W by S	S E	P.M. Heavy squalls; thick rain.
	2	6	0			
	3	6	0			
	4	6	0			

Log of the Sir William Bensley.

Extract from the Log of the H.C.S. Sir Wm. Bensley—*continued.*

Hour.	K	F	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
P.M. 5	5	0	W S W	S E	Heavy gales.
6					
7	5	0			
8	5	0			
9	4	6			
10	4	6			
11	4	6	....	....	Violent squalls.
12	4	4			
A.M. 1	4	4	W S W	S E	A.M. Ditto.
2	4	4			
3	4	4			
4	4	0			
5	4	4			
6	4	4			
7	4	4			
8	4	4	.. .	E	
9	4	4			More moderate.
10	5	0			Set the fore-topsail, and bent the fore-sail
11	6	0			Set the mizen-topsail.
12	6	0			Lat. 24° 26′ S, long. 60° 30′ E.
					Thursday, March 16, 1809.
P.M. 1	5	4	W S W	E by N	P.M. Fresh gales and cloudy weather in the first part; middle and latter, a confused and heavy swell.
2	5	4			
3	5	4			
4	5	4			
5	5	4			
6	5	4			
7	5	4			
8	5	0			
9	5	0			
10	5	0			
11	5	0			
12	5	0			
A.M. 1	5	0	W S W	E by N	
2	5	0			
3	5	0			
4	5	0			
5	5	0			
6	[illegible]	4			
7	5	4			
8	5	4			
9	5	4			
10	5	4			
11	5	4			
12	5	4			Noon. No ship in sight. Lat. 25° 59′ S, long. 58° 10′ E.

Storm recurving.

CHAP. VI.

Extract from the Log of the H.C.S. Sir Wm. Bensley—*continued.*

Log of the Sir William Bensley.

Centre of storm now West of the Bensley.

Hour	K.	F.	Courses	Winds.	Remarks.
P.M.					Friday, March 17, 1809.
1	6	0	W by S	E N E	P.M. Cloudy; first part, fresh breezes.
2	6	4			
3	6	4	W by S	E N E	
4	6	4			
5	6	4	....	N E	
6	6	6			
7	5	0			
8	5	0			
9	5	0			
10	6	0			
11	5	0			
12	4	0	...	N	Midnight. Hard squalls and rain.
A.M.					
1					
2	0	0	W S W	N N W	A.M. Lying-to, under bare poles.
3			off		
4			S W	N W	Heavy hard squalls.
5					
6	0	0	S W		
7			off S b W		
8				W N W	Middle and latter, heavy gales, with a high sea; obliged to throw twelve guns overboard.
9					
10	0	0	S by W		
11			off		No observation.
12			S by E		Lat. 26° 12′ S, long. 56° 50′ E.
P.M.					Saturday, March 18, 1809.
1	0	0	up	W by N	P.M. Cloudy, and blowing strong.
2	0	0	S W by S		
3	0	0	off S		
4					
5					
6	0	0	do.		
7					
8					
9					
10	0	4	S S E	S W	Set the reefed mainsail.
11	0	6			First part, strong gales; latter part,
12	1	0			moderate. No ship in sight.
A.M.					
1	1	0			
2	1	0	S E	S W	
3	1	0			
4	1	0			
5	1	0	W by N		
6	1	0			
7	1	0			
8	1	0	S by W		
9	1	0			
10	1	0			
11	1	0			No observation.
12	1	0			Long. 56° 20′ E.

Log of the Sir William Bensley.

Extract from the Log of the H.C.S. Sir Wm. Bensley—*concluded.*

Hour.	K.	F	Courses.	Winds.	Remarks.
P.M.					Sunday, March 19, 1809.
1	1	4	W by S	S W	
2	1	4			
3	1	6			
4	1	6			
5	1	6			
6	1	6			
7	1	6			
8	1	6			
9	1	6	W ½ S		
10	1	4			
11	1	4			
12	1	4			
A.M.					
1	2	0	W ½ S	S W	
2	2	0			
3	2	0			
4	2	0			
5	1	6			
6	1	6			
7	1	6			
8	1	6			(This ship seems to have been separated
9	1	6	W by S		from the fleet, and saw no vessel till she
10	1	6			rounded the Cape of Good Hope.)
11	1	6	W by N		
12	1	6			Latitude observed, 27° 24′ S.

Log of the Earl St. Vincent.

Extract from the Log of the H.C.S. Earl St. Vincent, Captain John Brook Sampson, towards England.—In *Nautical Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Monday, March 13, 1809.
1	7	0	W by S	S E	P.M. Cloudy; throughout a strong
2	7	0			trade, with frequent squalls and rain; a
3	6	6			swell from the south-east.
4	6	6			
5	6	5			
6	6	0			
7	6	0			
8	6	0			
9	6	5			
10	7	0			
11	7	5			
12	7	0			
A.M.					
1	7	4			A.M. Hard squalls and rains.
2	7	5			
3	7	0			
4	7	0			

CHAP. VI.

Log of the Earl St. Vincent.

Extract from the Log of the H.C.S. EARL ST. VINCENT—*continued.*

Hour.	K.	F	Courses.	Winds.	Remarks.
					Monday, March 13, 1809.
A.M.					
5	7	2	W by S	S E	
6	7	0			
7	6	0			
8	6	6			
9	7	0			
10	5	2			
11	5	4			
12	7	0			
					Lat. observed, 21° 19′ S. (Signed) ROBERT BROOKS.
					Tuesday, March 14, 1809.
P.M.					
1	7	0	W by S	S E	P.M. Squalls and rain; first and middle parts, a fresh trade; latterly, hard gale, variable at S and S E, with squalls, rain, and a high sea, very thick the latter part of the twenty-four hours.
2	6	5			
3	7	0			
4	7	5			
5	7	0			
6	7	5			
7	7	5			
8	7	5			
9	7	4			
10	7	5			
11	7	0			
12	7	0			
A.M.					
1	7	5			
2	7	6			
3	7	6			
4	7	6		S S E	
5	6	0			A.M. At 5, handed mizen-topsail, and close reefed main-topsail.
6	5	0			
7	5	0			
8	5	0			
9	4	5			Down top-gallant-yards.
10	4	5			Handed fore-topsail.
11	4	5			Split main-topsail; lost sight of the fleet.
12	4	5			No observation. (Signed) J. GUMM.
					Wednesday, March 15, 1809.
P.M.					
1	6	0	W by S	E	P.M. Throughout strong gales, with severe squalls and rain, a very high cross sea, ship making six inches water per hour, owing to her shipping many seas; pumped ship twice every watch.
2	6	0			
3	6	0			
4	6	0			
5	6	0			
6	6	0			
7	6	0	W S W		
8	6	4			
9	6	0	W S W	S E	Carried away the tiller-rope; rove a new one.
10	5	0			
11	4	0	S W b W		
12	4	0	S W b W		

Log of the Earl St. Vincent.

Extract from the Log of the H.C.S. Earl St. Vincent—*continued*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Wednesday, March 15, 1809.
A.M.					
1	4	0			A.M. At daylight no ships in sight;
2	4	5	S W	E S E	altered the course to west, suspecting the
3	4	0			fleet to be to the north, as we had kept to
4	6	0			the south during the night to ease the ship;
5	5	0	W		under a fore and reefed main-stayesail these
6	5	0			twenty four hours.
7	5	0			More moderate.
8	5	0			Rain and squalls.
9	5	0			No ships in sight.
10	6	0			
11	6	5			Moderate.
12	5	6			Lat. observed, 24° 19′ S.
					(Signed) ROBERT BROOKS.
					Thursday, March 16, 1809.
P.M.					
1	6	0	W	E by N	P.M. Fresh wind throughout, and
2	6	0			cloudy, with showers in the first and
3	6	0			middle parts; latterly fair.
4	6	0			
5	6	5			No ships in sight.
6	6	6			
7	7	0			
8	7	0			
9	7	0			
10	7	0			
11	7	0			
12	7	0			
A.M.					
1	7	0			
2	7	0			
3	7	0			
4	7	0			
5	7	0			
6	7	0			
7	7	4			A.M. At 7, out two reefs in the main-
8	7	4			topsail.
9	7	6			
10	7	5			
11	7	5			
12	7	6			Lat. 25° 27′, long. 58° 13′.
					Friday, March 17, 1809.
P.M.					
1	7	6	W	E S E	P.M. First part, strong breezes from the
2	7	6			eastward; middle and latter, strong gales
3	7	6			from N E to N W, with severe squalls and
4	7	6			heavy rain; high cross sea; put the ship
5	7	0			under fore and main-stayesails.
6	6	0			
7	5	0			
8	3	0		N E by E	
9	3	0			
10	3	0			

CHAP. VI.

Log of the Earl St. Vincent.

Extract from the Log of the H.C.S. EARL ST. VINCENT—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Friday, March 17, 1809.
P.M.					
11	2	0	W	N E b E	
12	1	5			
A.M.					
1	2	0			
2	2	2		N	
3	2	4			
4	2	5			
5	0	5			
6	0	5	up W b N		
7	0	5	off W S W		
8	0	5	up W b S	N W	
9	0	5	off S W b N		
10	0	5	up W N W		
11	0	5			
12	1	0	off S W		Lat. observed, 25° 9′ S, long. 57° 3′.
					Saturday, March 18, 1809.
P.M.					
1	0	0	up S W b W	W N W	P.M. Variable wind, and fresh breezes.
2	0	0	off S S W		
3	0	0			
4	0	0			
5	0	0	up S S W		
6	0	0	off S		
7	1	0		W by S	
8	1	6	N W b N		
9	1	6			
10	2	0	N W b N		
11	2	4		S W b W	
12	2	4			
A.M.					
1	3	0	W N W		
2	3	5	W by N		
3	4	5	W	S S W	A.M. At daylight, saw a strange sail
4	6	5			bearing W N W; made the private signal,
5	6	0	W by N		stranger proved to be the Terpsichore.
6	6	5			
7	6	0			Lat. observed, 25° 51′.
8	6	0	W by S		(Signed) JAMES GUMM.
9	6	4	W		
10	6	4			Memorandum.—The St. Vincent met
11	6	4			the Culloden again in lat. 28° 27′, at 1 P. M.
12	6	0			on the 28th March, 1809.

The documents explaining the Culloden's storm end here. The next log is that of the ship Boyne; and is placed here because the gale she experienced is also marked on Chart VIII.

Log of the Boyne.

Extract from the Log of the Ship Boyne, Captain William H. Stockley, from Bombay towards London, and in the Mozambique Channel; in lat. 15° 24′ S., long. 41° 30′ E.—In *Nautical Time.*

Chart VIII.

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
P.M.							Sunday, Jan. 11, 1835.
1	4	0	SW ½ W	N	30.00	83	P.M. First part, decreasing breeze from the N E; middle part, *calm, with squalls and hard rain;* light breeze and squally from S W.
2	2	4					
3	1	4					
4	2	0	..	N E			
5	0	0		Calm			
6	0	0					
9	2	0	S by E				Squally.
Midn.							
A.M.							
3	1	0	S				
4	1	4		W S W			
5	1	0	S by E				
8	2	0	S S E	S W			Squally.
11	3	0	S by E				Lat. 17° 8′ S, long. 40° 53′ E.
							Monday, Jan. 12, 1835.
P.M.							
1	1	4	S S W	W	29.90	82	First part, thick, unsettled weather, with constant heavy squalls from the S W; middle and latter part, fresh gales from the southward and westward, with squalls and heavy rain, and a long swell from the southward.
5	2	4	S S E				
6	2	4		S W			
9	0	0	up S S E				
Midn.	1	4	off S E				
A.M.							
2	1	4	N W				Taken aback in a hard squall; at daylight, down royal yards.
5	1	4	N W b N				Bent the storm mizen, and set it.
10	1	4	S by W				
12	2	0	S W by S				Lat. 17° 11′ S, long. 41° 7′ E.
							Tuesday, Jan. 13, 1835.
P.M.							
1	2	0	S S W	W by N	29.80		First part, blowing hard from the S W, with heavy squalls and rain; middle part, continual heavy rain, with vivid lightning and thunder, and the wind shifting all round; latter part, variable wind, with thick, unsettled weather.
2	2	0	S W by S				
				all round			
9	2	4	S W b W				
				Variable			Wind variable.
Midn.	2	0					
A.M.							
6	2	0	W S W	S S E			
9	2	0	W by S	Variable			Variable wind.
Noon				Variable			Wind variable. Lat. 17° 54′ S, long. 40° 46′ E.

CHAP. VI.

Log of the Boyne.

Extract from the Log of the Ship BOYNE—*continued.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
P.M.							Wednesday, Jan. 14, 1835.
1	3	0	SW b W	S S E	29.06		Unsettled weather, with squalls and hard rain.
5	5	0	W S W	. .			Blowing hard, and sea getting up.
10	2	0	SW b W	S by E			
A.M.							
2	2	0	W S W	S E			
8	2	0		S S E			Blowing hard. First part, variable, unsettled weather, and hard rain; middle and latter part, blowing heavy from the S S E. Lat. 18° 20′ S, long. 39° E.
P.M.							Thursday, Jan. 15, 1835.
1	2	0	S W	S E	29.05		Blowing a hard gale, with squally weather and rain; hard gales throughout from S S E.
Midn.	1	0	S S W				Ditto weather.
A.M.			Head SW to W S W				Lat. 18° 34′, long. 38°.
P.M.							Friday, Jan. 16, 1835.
					29.38		Heavy gale from the S S E, with heavy gusts at 8 A.M.; barometer still falling, and from 9 to noon the gale continued with increased force; at 10 A.M. the main-topsail went, and left the ship under storm mizen. Lat. 19° 5′ S, long. 37° 12′ E.
	1 to 1	4	Head fr. W S W to S W				
P.M.							Saturday, Jan. 17, 1835.
			Head WSW to S W		29.07		Wind decreasing.
2	1	4					
6	2	0	S	N			Light breeze.
8	7	0	S S E				Wind increasing, and drawing to the N E.
Midn.	6	0					Heavy gusts and hard rain.
A.M.							
2	8	0	S				First part, decreasing gale; middle part, hard gale from the N E, with severe gusts and heavy rain, and a high cross sea; ship labouring much.
7	4	4	S by E	E N E			Latter part, moderate breeze, and hazy. Lat. 21° 10′ S, long. 37° 4′ E.
P.M.							Sunday, Jan. 18, 1835.
	4	0	S b E ½ E	E	29.90		Throughout, a fresh breeze from the eastward; and next day a steady trade at E S E. Lat. 23° 14′ S, long. 37° 20′ E.

The Albion's Hurricane, in November, 1808.

Albion's hurricane.

It is a prevailing opinion amongst seamen who navigate the Indian seas, and it is stated in the minutes of inquiry into the storms of 1808 and 1809, that hurricanes are frequently avoided by ships steering on a course so as to keep well to the eastward of Mauritius. But the storm next to be described occurred in longitude *ninety degrees east*, about thirty degrees to the eastward of that island; and by the log of the Culloden the ships under her convoy in 1808 were in long. 80° E. when they felt the first indication of that hurricane which has been just detailed.

The fleet under convoy of H M. S. the Albion, 74 guns, consisted of nine ships belonging to the H. E. I. Company.

They sailed from Madras on October 5, 1808, had crossed the equator, and were in lat. 5° south, and long. 90°, when, on the 18th and 19th of November, they began to experience a heavy swell of the sea, and occasional squalls of wind. On the morning of the 20th the weather was much the same; but in the afternoon it began to blow hard, and on the 21st it amounted to a very severe hurricane.

The ships under the Albion's convoy were as stated below:—

The Anne and Preston, most to the northward.

The Ceylon and Tigris, nearest the Albion.

The Phœnix and Diana, got most to the southward.

The Glory, Lord Nelson, and the Experiment, foundered.

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Albion's hurricane.

This fleet was not very much dispersed, and the ships were carried but a little way from where they first encountered the severe part of the storm. But, as I have not been able to determine their relative positions, it has not been practicable to construct a chart; and therefore the logs of the E. I. C.'s ships have not been given in detail, but only extracts taken from them as here inserted.

The log of the Albion will be given here; and there is this remarkable difference between the storm now detailed, and those which have been hitherto traced, that the wind not only made the complete circle, but something more.

The ships Anne and Preston appear to have felt the storm less than the others of the fleet. The Anne had sprung her bowsprit, and had fallen astern; and the Preston was near her. In the course of the afternoon of the 21st all the other ships experienced a lull in the midst of the storm, although at somewhat different periods of time; but with all of them the wind on this afternoon veered very rapidly round the compass.

By the log of the Albion the gale began to moderate at 5 P.M. of the 21st. With the Ceylon it moderated at 2 P.M., but at 4 is reported "to have recommenced as hard as ever."

The Phœnix reports it was almost calm at 5 P.M., when she set close-reefed mizen-topsail and loosed her foresail. Her log at this time records, "light winds and variable all round." Two hours afterwards she had split her mizen-topsail and handed her foresail.

With the Tigris the gale had moderated at 1 P.M.; half an hour afterwards the wind died away suddenly altogether; but at 2, as expressed in the log, "came

on to blow if possible with greater violence than ever," and the ship had to lie-to under bare poles. The wind had veered as with the other ships.

Albion's hurricane.

In the Diana's log it is stated, "the gale broke at 1 P.M., continued to moderate till 5, and then came on as hard as ever," the wind veering round as stated by the other logs.

With the Diana and Phœnix (the ships most to the southward) the storm appears to have continued until the morning of the 23rd. With the Albion, and ships near her, the storm ended on the morning of the 22nd; and the Preston and Anne did not feel it after the 21st.

Missing ships when last seen.

The three missing ships were all seen on the afternoon of the 21st. The Lord Nelson was going fast ahead of the Phœnix, with three or four reefs in her main-topsail, and her foresail in the brails. The fore and mizen top-gallant yards were down.

The Glory was seen at the same time a little astern; and the commander of the Phœnix states in his evidence, that her topsails were double reefed, and her courses set, for she sailed very badly, and therefore had in general to carry much canvass.

The Experiment, at 2 P.M. of the same day, was seen to the eastward of the Phœnix, with her foresail and close-reefed main-topsail set, and her fore and mizen top-gallant masts down on the deck.

The violence of the wind in this hurricane appears to have been extreme. During its greatest fury the Diana and Phœnix are said to have been within a few inches of running foul of each other. With these two ships the gale appears to have been particularly severe on the 22nd, after it had left the other eight vessels.

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Albion's hurricane.

The log of the Diana states, "The noise of the wind resembled thunder, and on the afternoon of the 22nd it was still blowing a hurricane, with every gust apparently more violent than the last. The water in the hold gradually increasing, the gun-deck forward from the main hatchway four feet deep in water." At 5 P.M. her commander, finding the gun-deck filling very fast, had to remove the ladies and children; and for some hours they were every minute in expectation of the ship's sinking.

About this time a part of the upper fore-hatchway stove in with the weight of water above it. In this state of the ship, the commander ordered to cut away the foremast, which was with difficulty effected, from the exhausted state of the crew. At midnight the wind with this ship moderated considerably, at which time she must have been about a degree of latitude south of the Albion.

This storm does not appear to have been moving onward, at first, with the regular progression of those which have been traced on the charts; but seems more to have resembled the commencement of a whirlwind, floating with irregular motion, as waterspouts do in calm weather; yet, after it left the fleet, we see by the logs of the Diana and Phœnix that they felt the hurricane a considerable time after the other ships. By their observations they were to the southward; and if this storm, like that of the Culloden, last described, had set the currents to the westward, these ships were probably south-west of the Albion; and, being yet within the influence of the storm, must have commenced a progress not dissimilar to others traced in south latitude.

Log of the Albion.

Extract from the Log of H. M. S. ALBION, Captain John Ferrier. In *Civil Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Thursday, November 17, 1808.
1	..	..	S S W	W by N	A.M. Fresh breezes and squally.
2	..	..			
3	..	..			
4	..	..			Moderate breezes and cloudy; convoy
5	..	..			in company.
6	..	..			
7	..	..	S by W	W by S	
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..			Lat. 5° 47′ S, long. 89° 40′ E.
P.M.					
1	..	..	....	W by S	P.M. Fresh breezes and cloudy.
2	..	..			
3	..	..			Set the mainsail and jib.
4	..	..			
5	..	..	S by E		
6	..	..			
7	..	..	S by W		Moderate breezes and cloudy.
8	..	..			
9	..	..			Fresh breezes and squally, with rain.
10	..	..			
11	..	..			Squally; down jib.
12	..	..			
A.M.					Friday, November 18, 1808.
1	..	..	S by W	W by S	A.M. Eleven sail in sight.
2	..	..			Squally, with rain; up mainsail.
3	..	..			Cloudy; squally, with rain.
4	..	..			
5	..	..			Fresh breeze and cloudy.
6	..	..			
7	..	..			
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..	S		Lat. 7° 33′ S, long. 89° 50′ E.
P.M.					
1	..	..	S by W	W by S	
2	..	..			
3	..	..	S by E	W S W	
4	..	..	S		
5	..	..	S ½ W		
6	..	..			
7	..	..	S ½ E		
8	..	..			
9	..	..	S by E	Variable	Moderate breezes and cloudy.
10	..	..	S ½ W		
11	..	..	S ½ E		
12	..	..	S		

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Log of the Albion.

Extract from the Log of H. M. S. ALBION—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Saturday, November 19, 1808.
1	2	0	S ½ W	W by S ½ S	A.M. Squally.
2	3	2			At daylight, convoy in close order.
3	3	4	S S E		
4	2	6			
5	2	4			
6	2	0			
7	2	0			
8	1	4			
9	2	0			
10	1	4			
11	2	0			Course, S 20° E, distance 53 miles.
12	2	0			Lat. 8° 23′ S, long. 90° 18′ E.
P.M.					
1	3	4	S ½ W	W b S ½ S	
2	3	4	S by W	W by S	
3	3	0			
4	3	0			
5	3	4			
6	3	6	S ½ E	Variable	
7	3	0	S		
8	5	0			
9	4	6	S ½ W	W b S ½ S	
10	4	4			
11	3	4	S by W	W by S	Moderate breezes and cloudy; double-reefed topsails.
12	3	6	S		
A.M.					Sunday, November 20, 1808.
1	4	0	S by W	W by S	
2	4	4			
3	4	4	S b W ½ W		
4	4	4			
5	4	0	S	W	A.M. Fresh breezes and squally; in third reef in the topsails.
6	4	0			
7	4	0	S by W		
8	3	0			
9	2	0			
10	2	2	S		
11	2	4			
12	2	0			Lat. 9° 41′ S, long. 90° 52′ E.
P.M.					
1	2	0	....	W	
2	2	4			
3	2	4			
4	2	4			
5	2	4	....	W by S	Fresh gales and squally, with rain and a heavy swell; split the fore-staysail.
6	3	0	head fr. S		
7, 8	0	0	to S S E		
9, 10, 11, 12	0	0	up S W off S S E		
					Course, S 23° E, distance 85 miles.

Log of the Albion.

Extract from the Log of H. M. S. ALBION—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Monday, November 21, 1808.
A.M. 1, 2, 3, 4	0	0	head fr. S to S S W	W N W	A.M. Hard gales and squally, with rain; one sail in sight; a very hard squall; hauled down the storm-staysail; the ship making much water. At 4, strong gales, with hard squalls and rain; all the pumps going.
5, 6, 7, 8	0	0	up S S W off S		Very heavy squalls, with rain; the fore-topmast blew over the side by the cap; the mast in falling carried away the larboard side of the top. Very heavy gales, with rain and hard gusts of wind. 7.30, the main-topmast blew over the side.
9			up S S W		9.30, the mizenmast went by the board.
10, 11, 12	0	0	head fr. E N E to E	N W N	The ship payed-off; set the fore-staysail and wore. Began to throw overboard the main-deck guns; the ship labouring very much, the mainsail blew from the yard, and a great part of the foresail; the fore-staysail blew to pieces from the netting in the bowsprit. Course, S 58° E, distance 40 miles. Lat. 10° 6′ S, long. 91° 23′ E.
P.M. 1				N E	P M. Thick weather, with heavy gales, accompanied with hard gusts of wind and rain, and a great sea, the latter blowing over the ship; employed at the pumps and throwing overboard the main-deck guns. At 3, left off the latter duty, after having thrown overboard 19. At 3.30, an extreme hard gust of wind. At 4, a heavy sea running; ship labouring very much. At 5, the gale began to moderate. At 8, fresh gales and thick weather. Midnight. Moderate breezes and thick swell.
2				E	
3				S E	
4	0	0	head fr. E to S	S S E	
5				S	
6				S by W	
7					
8				S W b S	
9			head	S W b W	
10			N by E	W	
11, 12	0	0	head N N E	W N W	
					Tuesday, November 22, 1808.
A.M. 1, 2, 3, 4	0	0	ship's hd from N E to E N E	variable from W to N and N E	A.M. Moderate breezes at times, with great swell. At daylight, saw the Ceylon.
5, 6, 7, 8	0	0	head fr. N E to N E b N		Fresh breezes and cloudy weather, with a great swell; found the third main-chain plate on the starboard side, and the eighth fore one on the larboard side, drawn; the barge stove, by the fall of the main-top-gallants; the ship working much on the upper, lower, and orlop decks; the hooping butts, over the ports, opened one inch;
9, 10	0	0	head fr. N N E to N E		the seam, next the waterways, on the lower deck, three-quarters of an inch; the fastenings on the butt-ends of the

CHAP. VI.

Log of the Albion.

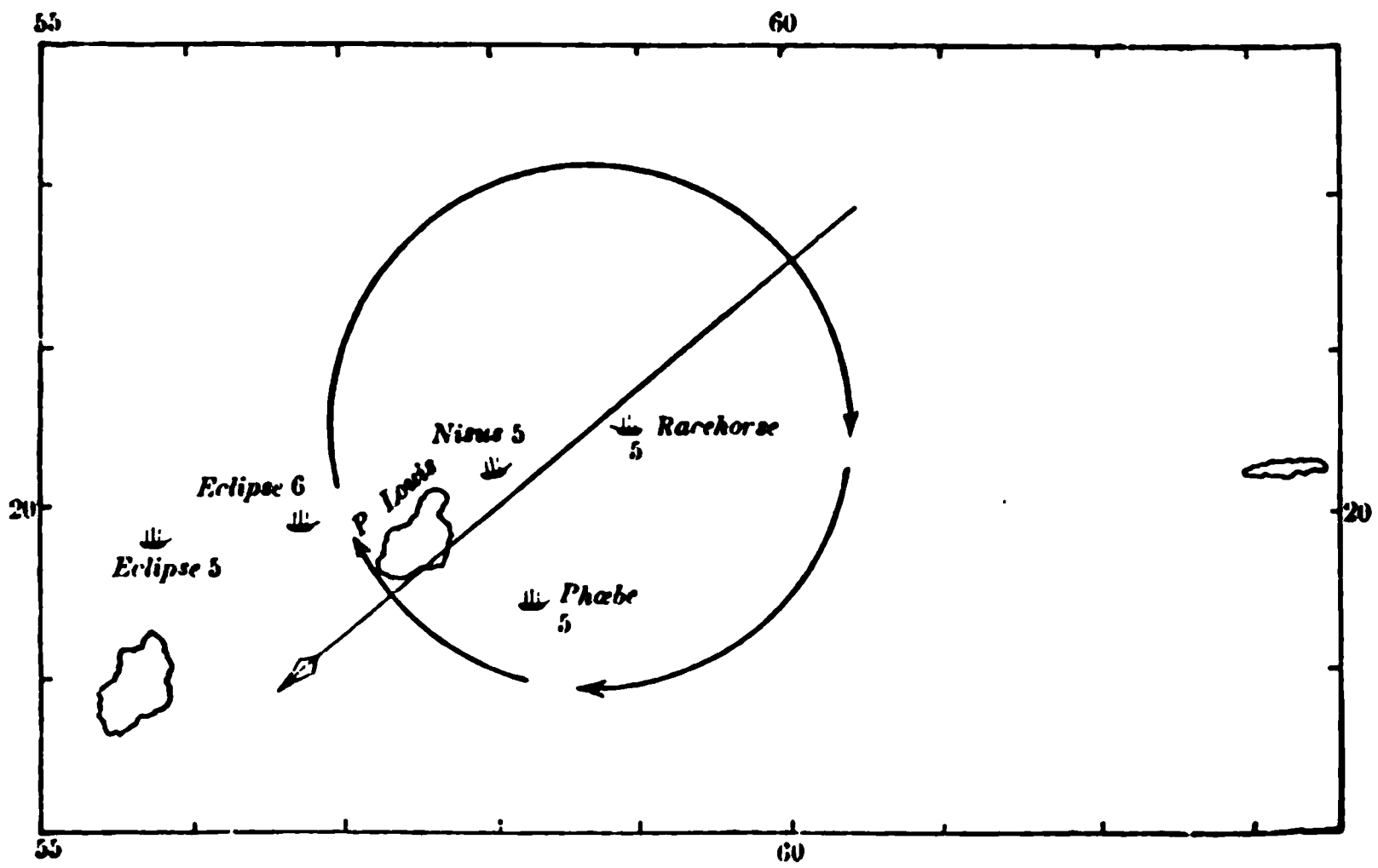
Extract from the Log. of H.M.S. ALBION—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Tuesday November 22, 1808.
A.M. 11	0	0	head fr. N N E to N E	Variable fr. W to N and N E	deck planks, transom, and breast hooks drawn the black streak on the starboard side and several bolts broke threw overboard twelve of the lower-deck guns and frapped the ship with an 8-in. hawser.
12					Noon. Fresh breezes and cloudy weather. Course, N. 79° W., distance 8 miles. Lat. 10° 31′ S, long. 91° 12′ E.
P.M. 1	0	0	ship's hd. from N to N E	ditto	
2					
3					
4					
5	0	0	ship's hd. fr. N b. W to N b. E		
6					
7	0	0	head S		P.M. Moderate breezes; Ceylon in company; employed in clearing the wreck; towards midnight light breezes.
8	1	4	S	W S W	
9	1	6			
10	1	4			
11	1	4	S ½ W	W by S	
12	1	4			
					Wednesday, November 23, 1808.
A.M. 1	1	0	S ½ W	W by S	
2	1	0			
3	1	0			
4	1	0			
5	1	4	S		
6	1	4			
7	1	4			
8	1	4			
9	2	4			
10	2	2			Course, S 22° E, distance 32 miles.
11	2	4			Lat. 10° 31′ S, long. 91° 12′ E.
12	1	6			
P.M. 1	1	2	S ½ E	W by S	
2	1	0	S by E		
3	1	0	S b. E ½ E		
4	1	0			
5	1	4	S S E		
6	1	4	S by E		
7	1	0	S S E		
8	1	0			
9	1	0			
10	1	0			
11	1	0			
12	1	0			

Mauritius Gales of 1811.

Mauritius gales.

The next figure shows the relative positions of the Astræa and four other vessels of war, on the 5th and 6th of March, 1811, when the Astræa was in the harbour of Port Louis, Mauritius. All five vessels had fine weather on the morning of the 5th.



We find by the logs which are here printed, that the Racehorse and Phœbe, which ships were most to the eastward, were the first to prepare for bad weather, and they began to do so between eight and ten in the forenoon. The Nisus, though she felt squalls, did not prepare until the afternoon, and the Astræa in the harbour had still "light airs" at noon.

It was night before the Eclipse felt it; and this ship, the furthest to the westward, did not strike her top-gallant-masts until the morning of the 6th.

Thus these vessels are found feeling the storm in succession, as if it came from the eastward, moving

CHAP. VI.

Mauritius gales.

slowly to the west. The Racehorse and Eclipse were about 180 miles from each other; and, as twelve hours elapsed from the time when the former prepared for the gale and when the Eclipse split a topsail, we may infer the storm moved at the rate of about 15 miles an hour.

A ship called the Melville is mentioned in the Astræa's log; and could the Melville's log be found it would tend to explain further the nature of this gale; but the Melville was not one of the regular East India ships; for there is no record of such a vessel at the India House.

The Racehorse, the ship furthest to the north, seems to have been in the track of the centre of the gale, and between 4 and 5 o'clock P.M., on the 5th, to have been almost in the centre itself. The wind is reported to be then veering very fast; and it would appear as if the Racehorse crossed the gale's central path. The courses and the wind, as stated in the log, are no doubt the magnetic bearings. The variation of the needle at Mauritius, as given in "Norie's Navigation," was 16° 20′ W., in the year 1789.

Log of the Racehorse.

Extract from the Log of H. M. S. RACEHORSE, Captain William Fisher; kept by Lieut. J. B. Tatnall.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
1	2	6			A.M. Moderate and fine.
2	3	0	E by N	S E by S	
3	2	2			
4	1	6			
5	2	0			
6	4	0			
7	4	2	S W by S		At 7, fresh breezes and squally weather
8	3	6			8. 30, in main top-gallant-sail and third

Log of the Racehorse.

Extract from the Log of H. M. S. RACEHORSE—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
9	3	2	S W by S	S E by S	reef of the topsails; got the royal masts on
10	3	4	S by E		deck and flying jib-boom in; squally, with
11	3	4	E by S		rain; in third reef of boom-mainsail.
12	3	4			Noon. Ditto, weather.
					Course, N 75° E, distance 44 miles.
					Lat. 19° 39′ S, long. 58° 28′ E.
					Round Island, S 73° W, 44 miles.
P.M.					P.M. Fresh gales and squally weather, with heavy rain.
1	4	2			At 1, down main top-gallant-yard and
2	2 / 1	0 / 0	E ¼ S	S by E	got main-topmast on deck; got the sprit-
3	3	3	E b N ½ N		sail-yard and jib-boom in; sent the stud-
4	3	0	E		ding-sail-booms on deck. At 2, increasing
5	11	0			gales; in fore-topsail; set the fore-staysail
6	1	0	up S E		and furled the square-mainsail; reefed the
			off E S E		trysail. At 4, strong gales; up foresail and
7	0	0	E N E	S S W	furled it. At 5, *the wind shifted suddenly*
8	0	0			*round to the* N E, which caused the ship to
9	0	0	up E by S		labour very much. 5.10, in main-topsail;
10	0	0	off S E		got the main boom and gaff on deck. At
11	0	0		N W b N	6, ditto weather, strong gales; lying-to
12	0	0			under the reef-trysail and fore-staysail.
					Midnight. Strong gales, with sudden squalls.
A.M.					March 6, 1811.
1 / 2	0	0	up S E b S	N W b N	A.M. Strong gales, with heavy rain at
3	0	0	off S		times.
4	0	0			At 4, ditto, ditto.
5	0	0			
6	0	0			More moderate; set the main-trysail.
7	0	6			At 7, set the foresail; heavy squalls,
8	1	0			with rain; observed that three parts of the
9	2	2	S E by S		gammoning of the bowsprit were gone.
10	2	0			7.50, squally; up foresail. At 8, ditto
11	2	6			weather; fresh gales, with heavy rain.
					9.30, *set the foresail.*
12	2	6	S S E		Noon. More moderate, with drizzling rain.
					Course, S 7° 42′ E, distance 18 miles.
					Lat. 19° 52′ S, long. 58° 42′ E.
					Round Island, N 83° W, 53 miles.
P.M.					
1	3	0	S S E	E by N	P.M. Fresh breezes, with squalls and
2	3	0			heavy rain.
3	3	4			1.30. Set the square mainsail; got the
4	2	2			main-boom and gaff shifted. At 4, mode-
5	3	2			rate and clear weather. At 6, fresh breezes
6	3	2			and clear weather. At 7, up mainsail and
7	2	6			furled it; squally, with heavy showers of
8	2	3			rain. At 8, ditto weather.
9	2	4			
10	2	2			
11	2	2	S E ½ E	E	
12	3	2			Midnight. Fresh breezes and cloudy weather.

Lying-to.

CHAP. VI.

Log of the Phœbe.

Extract from the Log of H. M. S. PHŒBE, Captain James Hillyar; kept by Lieut. Kenelm Somerville.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
1	3	0	S W	S E	A.M. Moderate and cloudy weather.
2	2	4			8.30. In top-gallant-sails; down jib.
3	2	0			10 50. Squally; up courses; close-reefed
4	3	4			topsails.
5	3	4			
6	3	0			
7	5	0	E N E		
8	5	6			
9	8	0			
10	7	0	N N E		
11	6	4			
12	5	4			Noon. Fresh winds and squally weather. Course, N 12° E, distance 29 miles. Lat. 20° 7′ S, long. 58° 26′ E. Isle of Flamondo, N 68° W, 38 miles.
P.M.					
1	3	2	E	variable	P.M. Fresh breezes and squally, with
2	3	0	N E		heavy rain.
3	2	2	E N E	S E	1.40. Handed the topsails; reefed the
4	2	4	NE by N		courses; down top-gallant-yards.
5	3	4			5.30. Struck top-gallant-masts. At 6,
6	3	4			squally, with rain; got the top-gallant-
7	3	0			masts on deck and in jib-boom; split the
8	3	6			main staysail; shifted it.
9	3	4	N E	E by N	
10	3	4			
11	3	4	N W	N E by E	
12	3	0			Midnight. Strong gales and squally weather.
A.M.					March 6, 1811.
1	3	0	N W	E N E	A.M. Fresh breezes and squally, with
2	2	4			heavy rain.
3	2	4			
4	2	4	N ½ W		At 4, ditto weather.
5	3	0			
6	3	0			6.30. Fresh breezes and cloudy.
7	3	0			
8	3	0	N		
9	3	4	S b E ½ E	E	
10	3	4			
11	3	4			
12	3	2			Noon. More moderate. Lat. 19° 43′ S, long. 57° 51′ E. Round Island, S W by W ½ W, 10 miles.
P.M.					
1	3	4	S S E	E ½ N	P.M. Fresh breezes and cloudy weather.
2	3	4			
3	3	4			
4	4	0	N		
5	4	0	N W		

Log of the Phœbe.

Extract from the Log of H. M. S. Phœbe—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					March 6, 1811.
6	4	4	N W	E ½ N	At 6, moderate and squally weather.
7	3	6			
8	3	4	N by E	Variable	At 8, ditto weather.
9	4	6			
10	4	4			
11	4	2			
12	4	2			

Log of the Nisus.

Extract from the Log of H. M. S. Nisus, Captain P. Beaver. In *Civil Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					March 5, 1811.
1	2	6	SW by S	SE by S	A.M. Moderate and cloudy.
2	2	4			
3	2	2	SSW½W		
4	2	0			
5	2	0	SW by S		At 5.30, squally.
6	2	0	SW ½ S		
7	2	0	SW by S		
8	2	0			At 8, squally, with rain.
9	0 4	6 2	N N E		
10	7	2	NE by N		
11	3	0	SWbyW		
12	1 2	4 6	N E		Noon. Fresh breezes & squally, with rain.
					Course, S 79 E°, distance 12° W. Lat. 19° 54′ S, long. 58° 5′. Round Island, N 79° 12′ W, 19 miles.
P.M.					
1	5 1	4 4	N E E N E	E S E	P.M. Fresh breezes and squally. 12.40. close-reefed the topsails; furled ditto,
2	1	6	E by N	SE by S	At 2, reefed the courses, hard squalls, took in and set the storm-staysails, occasionally furled mainsail.
3	1	6			At 3.45, struck top-gallant-masts.
4	1	6			At 4, hard squalls and rain.
5	1	6	E by N ½ N		At 5, sent top-gallant-masts on deck. 5.45, down main-staysail.
6	1	6			At 6, hazy weather and hard squalls.
7	2	2	E by N		7.10, carried away the starboard bomkin.
8	1	0	E N E		At 8, ditto weather.
9	1	4	up E N E off N E by N		
10	2	0		SE by E	
11	2	0			
12	2	0	N N E off N bW		Midnight. Fresh gales and squally; constant rain.

CHAP. VI.

Log of the Nisus.

Extract from the Log of H. M. S. NISUS—*concluded*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 6, 1811.
1	1	6	N ½ E	E N E	A.M. Fresh gales and squally, withrain.
2	1	0	N by W		
3	1	2	N		
4	1	0	N by E		At 4, ditto breezes and squally, ditto.
5	0	0	up N N E off N b W		
6	1	0			
7	2	2	N N E	E	
8	2	2			At 8, ditto ditto ditto.
9	2	0			
10	2	6	N ¼ E	E N E	
11	3	4	N		
12	3	2	N ½ W		Noon. Ditto weather. Lat. 35° S. Round Island, S ¾ W, 7 or 8 leagues.
P.M.					
1	3	0	N ½ W	E N E	P.M. Fresh breezes and cloudy.
2	3	0			
3	2	0			
4	2	6			At 4.10, squally.
5	1	4	up N off N by W		
6	3	4	N	Variable	At 6, fresh breezes and squally.
7	2	2	N b W ½ W		
8	1	6	N ½ W		
9	2	0	N by E	E by N	
10	2	2			
11	2	0			
12	1	6			Midnight. Fresh breezes and cloudy.

Log of the Astræa.

Extract from the Log of H. M. S. ASTRÆA, Captain C. M. Schomberg.—In *Civil Time*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
1	..	..	In Port Louis	Calm	A.M. Clear, fine weather.
2	..	..			
3	..	..			
4	..	..	....	S E	Light airs and cloudy weather. Sailed, the Melville, E.I.C. ship, for Bengal.
5	..	..			
6	..	..	....	Variable	
7	..	..			Light airs, with rain.
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..			

Log of the Astræa.

Extract from the Log of H. M. S. ASTRÆA—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					March 5, 1811.
1	..	..	In Port Louis	SSE	P.M. Squally, with showers of rain.
2	..	..			
3	..	..			
4	..	..			
5	..	..			
6	..	..			
7	..	..			
8	..	..			
9	..	..			Heavy squalls, with constant, heavy rain.
10	..	..			
11	..	..			
12	..	..	....	Variable	Ditto weather.
A.M.					March 6, 1811.
1	..	..			A. M. Heavy squalls, with constant, heavy rain; got top-gallant mast on deck, and struck lower yards and topmasts; squally, with showers of rain; got the sheet anchor over the side ready for letting go.
2	..	..	ditto	ditto	
3	..	..			
4	..	..			
5	..	..			
6	..	..			
7	..	..			
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..			
P.M.					
1	..	..			P.M. Squally, with showers of rain; got the stream cable out on the larboard bow; one of the larboard cables broke; got a new one from the dock-yard.
2	..	..			
3	..	..			
4	..	..			
5	..	..			
6	..	..			
7	..	..			
8	..	..			
9	..	..			
10	..	..			
11	..	..			
12	..	..			Ditto weather.

Log of the Eclipse.

Extract from the Log of H. M. Brig ECLIPSE, Captain W. Steed.—In *Civil Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
1	4	0	S S W	S E	A.M. Light breezes and cloudy.
2	3	4	S by W		
3	3	6	S ½ W	Variable	
4	3	6	S by W		

CHAP. VI.

Log of the Eclipse.

Extract from the Log of H. M. Brig ECLIPSE—*concluded*.

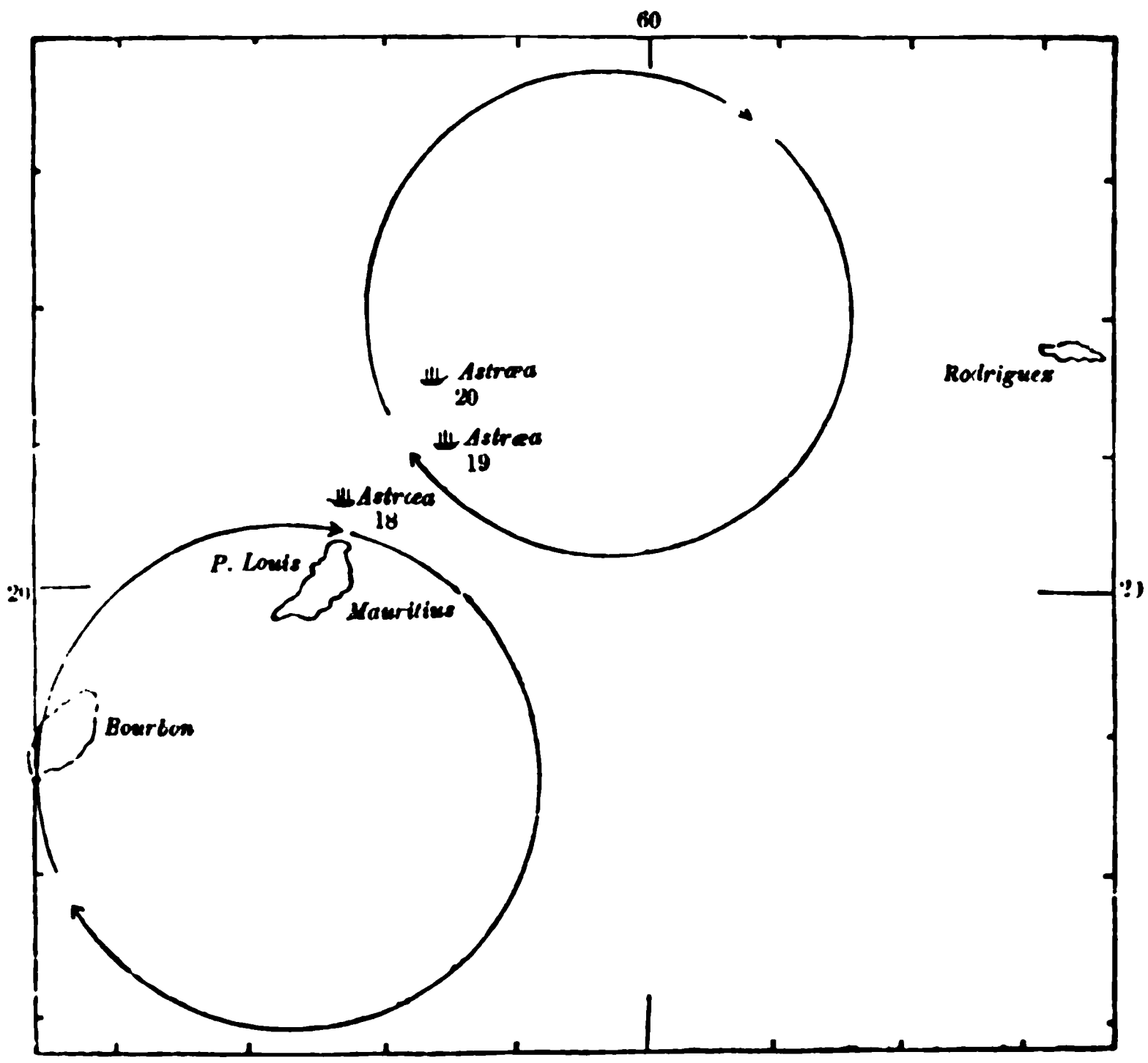
Hour.	K.	F	Courses.	Winds.	Remarks.
A.M.					March 5, 1811.
5	2	0	E S E	Variable	
	1	6			
6	2	2	S E by E		
7	3	0	S E ½ E		
8	3	0	S E		
9	3	0	S E by E		
10	3	0	S E ½ E		
11	2	6	S E	Variable	
12	4	0	S E by E		
					Course, S 16° 52′ E, distance 67 miles. Lat. 20° 20′ S, long. 54° 44′ E. Port Louis, N 44° E,* 105 miles.
P.M.					
1	5	0	E by S ½ S	S by W	P.M. Fresh breezes and cloudy.
2	6	0			
3	5	6			
4	6	2			At 4, ditto weather.
5	5	4			At 5, fresh breezes and squally.
6	3	0			
7	2	0	E by S		
8	3	6	E	Variable	At 8, ditto, ditto. 8. 50, split the fore-topsail; shifted ditto, and in four reefs of the topsails.
9	3	4	E ½ S		
10	3	2			
11	2	0	E		
12	3	4	E ½ S		
					March 6, 1811.
A.M.					A.M. Fresh breezes and squally; furled the fore-topsail, and struck top-gallant mast; employed securing the booms, furled the boom mainsail.
1	3	2	E by S		
2	3	0			
3	2	6			
4	3	0	E		At 4, strong gales with very heavy squalls.
5	2	4			
6	2	0	up E b N		
7	1	6	off N E		
8	1	6	by E		At 8, ditto weather; reefed the foresail, and handed the main-topsail; got the top-gallant masts on deck; in jib-boom; got the spritsail yard on deck.
9	0	0	up E N E		
10	0	0	off		
11	0	0	N N E		
12	0	0			Course, S 62° E, distance 68°. Lat. 19° 48′, long. 56° 48′. Port Louis, S 61° E, 58 miles.†
P.M.					
1	0	0			P.M. Fresh gales and squally, with rain at times. 1. 30, set the fore-staysail and trysail.
2	1	0	up N E b N		
3	1	4	off N		
4	1	4			At 4, ditto weather.
5	1	4	up N N E		
6	2	0	off N		At 6, ditto, with rain.
7	2	0	up N E b E		
8	1	6	off N b W		At 8, ditto, ditto.
9	1	0			Fresh gales and cloudy.
10	1	0	up N b E		
11	1	0	off N b W		
12	1	0			Noon. More moderate.

* There appears to be some mistake here; supposed to mean Port Louis, N 86° 17′ E, 154 miles.

† Supposed to mean Port Louis, S 75° 6′ E, 86 miles.

Mauritius Gales.

The Astræa sailed from Port Louis harbour on the 15th of March, previous to which day, the Racehorse, Phœbe, and Eclipse had come in, and anchored in that port. The figure following will show the course of the Astræa, from her leaving the harbour until she met another gale more severe than the first one.



The figure is also intended to point out the course this second gale appeared to take.

The Astræa began to prepare for this second gale on the afternoon of the 18th; and we find by the log, that she was lying-to from 7 o'clock on the evening of the 19th, until 8 o'clock on the evening of the 20th, or twenty-five hours; the Nisus was near her at the time, and her log is here given; but slight discrepancies

CHAP. VI.

Mauritius gales.

in these logs prevent my being able to lay down the exact relative positions of these two vessels, for which reason the place of the Astræa is only marked. The Nisus laid-to at an earlier hour, and continued in that position nearly the whole time, until ten at night of the 20th.

The logs of the Phœbe, Racehorse, and Eclipse, which were lying in Port Louis harbour, follow that of the Nisus; and no notice is taken of bad weather in these logs until the 20th, when the gale began, and continued till the 21st: all five logs report the wind beginning at the southward of east, and ending at the northward of west.

The Astræa and Nisus had again fine weather on the 21st of March; and the three ships in harbour on the 22nd.

Log of the Astræa.

Extract from the Log of H. M. S. ASTRÆA, Captain C. M. Schomberg, kept by Lieut. John Baldwin.—In *Civil Time*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Monday, March 18, 1811. Lat. 19° 36′, long. 57° 53′. Round Island, S W, 5 leagues.
P.M. 1	4	6	E by N	S E	P.M. Fresh breezes and cloudy weather; unbent the fore and main-topsail, and bent better ones; close-reefed them; down top-gallant-yards, and struck the masts; got in flying jib-boom.
2	4	2			
3	4	0	E N E		
4	4	2			
5	5	0	E by N		
6	6	4			
7	5	4			
8	6	0	E	S S E	
9	5	0			
10	6	6			At 10, ditto weather; reefed the courses and set them; set trysails.
11	7	6			
12	3	4			Squally weather.
	3	0	E N E		
A.M.					Tuesday, March 19, 1811.
1	4	4	E	S S E	Squally, with rain.

Extract from the Log of H. M. S. Astræa—*continued*.

Hour.	K.	F.	Courses.	Winds.	Remarks.
					Thursday, March 19, 1811.
A.M.					
2	4	4			
3	4	4	S W		
4	4	2			At 4, squally weather; furled fore-top-sail; got jib-boom in.
5	5	0	S W b W		
6	5	0			
7	4	0	E		
8	4	0			
9	4	0	E by S	S by E	
10	3	0			
11	2	2			
12	2	2	E b S ½ S		Strong breezes and a heavy sea from the eastward. Lat. 19°, long. 58° 33′. Round Island, S 40°, distance 68 miles.
P.M.					
1	2	2	E S E	S	P.M. Ditto weather. 1.30, up mainsail; got top-gallant-masts on deck; strong gale, with showers of rain. Furled the main and main-topsails.
2	2	0			
3	2	2	E by S		
4	2	0			
5	2	4			
6	2	0			
7	0	0	up E b S	E by N	Up foresail.
8	0	0	off E b N		Fresh gale and squally, with rain; reefed the trysail and set it.
9	0	0	....	S by E	
10	0	0	up E off		
11	0	0	E N E		
12	0	0			Midnight. Ditto weather.
					Wednesday, March 20, 1811.
A.M.					
1	0	0	up E b S		A.M. Strong gale, with rain and a heavy sea.
2	0	0	off E b N	S	
3	0	0	up S E		
4	0	0	off E S E		At 4, ditto weather.
5	0	0	. .	W S W	
6	0	0			At 6, the gale increasing, with constant rain; fore-staysail halliards broke, hauled the sail down; observed the drift of the ship to be 1¼ mile per hour.
7	0	0	up S		
8	0	0	off S S E		
9	..	..	up S b. E	W S W	At 9.30, took second reef in the trysail, the only sail now set.
			off S E b S		
10	.		up S S W		
			off S W		
11	..	..	up S W b S		
			off S b W		
12	..	..	up S W		Strong gale and cloudy.
			off S S W	W N W	Lat. 18° 37′, long. 58° 48′. Round Island, S 39° W, distance 95 miles.
P.M.					
1	..	..	up S W	W N W	P.M. Strong gale and squally, with rain. 1.30, bore up; set fore-staysail.
2			off S S W		
3					At 3, hauled to the wind.
4					
5	..	..	up S W ½ S		At 5.30, more moderate.
6			off S W b S		

CHAP. VI.

Log of the Astræa.

Extract from the Log of H. M. S. ASTRÆA—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Wednesday, March 20, 1811.
7	..	..	up N E	N W	At 8, ditto weather; set main-staysail.
8	..	..	off E b N		
9	..	..			
10	..	..			
11	..	..			
12	..	..	....	N W	Ditto weather.

Log of the Nisus.

Extract from the Log of H. M. S. NISUS, Captain P. Beaver. In *Civil Time.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Tuesday, March 19, 1811.
1	3	0	S W ½ S	S S E	A.M. Fresh breezes and cloudy weather.
2	3	2	S W by S		At 2. 10, squally; in fore and mizen-topsails, and mizen-storm-staysail.
3	2	2	....	S by E	At 3. 40, in main-topsail; furled the mainsail.
4	1	6	up E by S off E N E		At 4, ditto weather. 4. 15, wore ship; down top-gallant-mast; in flying jib-boom. 8, fresh breezes and squally.
5	1	6			
6	2	0			
7	2	0	....	Variable	
8	1	6	up E ½ S off E b N		
9	2	0			At 9. 15, close-reefed main-topsail.
10	2	2	E	S S E	
11	3	0	E ½ N		
12	2	6	E		Noon. Fresh gales and hazy weather. Course, N 50° E, distance 41′. Lat. 19° 19′, long. 58° 18′. Round Island, S 50° W, 41 miles.
P.M.					
1	1	4	up E off E N E	E S E	P.M. Commences very strong gales and dark cloudy weather.
2	0	0			
3	0	0	....	S S W	
4	0	0	up S E b E off E		At 4, hard gales and constant rain.
5	0	0	up S E b E off E by S		
6	0	0			At 6, very hard squalls.
7	0	0	S E to S E by E		
8	0	0	S E b S to S E by E		At 8, hard gales and rain; got the fore runners up, and secured the foremast.
9	0	0	S E off S E by E		
10	0	0			10. 20, *the wind shifted to the north-west.*
11	0	0	S to S S E	N W	
12	0	0	S S W to S		Moderate; ditto weather.

Log of the Nisus.

Extract from the Log of H. M. S. Nisus—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Wednesday, March 20, 1811.
1	1	2	up E off E N E	Variable	A.M. Hard gales and dark cloudy weather.
2	0	0			Hard gales and constant rain.
3	0	0			
4	1	0	up S E		
5	0	0	off E S E		
6	0	0			
7	0	0	S E to S by E		
8	1	0	S E to S E by E		At 8, ditto, ditto.
9	0	0			
10	0	0			Noon. Hard gales and heavy squalls, with
11	0	0	....	S S E	rain; ship under fore and mizen-staysails.
12	0	0	S	W.	Course, N 39° E, distance 42′. Lat. 18° 47′, long. 58° 46′. Round Island, S 42° W, 84 miles.
P.M.					
1	..	..	up N W off S W b W	W N W	P.M. Fresh gales and squally.
2	..	..			
3	..	..			
4	..		up N W by W off E S b S		At 4, more moderate.
5	..	..			
6	..	..	W N W		
7	..	..	off S W		
8	..	..	....	N W	
9	..		W by S off S W b W		
10	..	..	W off W N W		At 10. 20, squally, with heavy rain.
11	..	..			
12	..	..	....	N N W	Midnight. Strong breezes and squally.

Log of the Phœbe.

Extract from the Log of H.M.S. Phœbe, Captain James Hillyar, in Port Louis, Mauritius.—In *Civil Time.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, March 20, 1811.
A.M.	.....	South^{ly}	A.M. Strong breezes and squally weather; sent top-gallant-mast on deck.
P.M.	.....	S by E S by W	P.M. Squally, with rain; struck lower yards and topmasts; employed heaving taut the moorings.
10			Heavy squalls; blew away the mizen-storm-staysail.

CHAP. VI.

Log of the Phœbe.

Extract from the Log of H. M. S. PHŒBE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Thursday, March 21, 1811.
A.M.	.....	S W	A.M. Strong breezes and squally, with rain.
P.M.	.....	Westerly	P.M. Ditto weather; employed heaving taut the moorings.
Midn.			Midnight. More moderate.

Log of the Racehorse.

Extract from the Log of H. M. S. RACEHORSE, Captain W. Fisher, in Port Louis Harbour, Mauritius, kept by Lieutenant J. B. Tatnall.—In *Civil Time.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, March 20, 1811.
A.M.	.....	S E	A.M. Fresh breezes and clear weather.
4			Ditto weather.
Noon	.....	Variable	Strong breezes, with heavy squalls.
P.M.			P.M. Strong breezes, with heavy squalls of wind and rain.
6			Ditto weather.
11			Hard gales and continued heavy rain.
Midn.			Midnight. Heavy weather; brought home the stern anchor, and slightly touched.
			Thursday, March 21, 1811.
A.M.	.. ..	W	A.M. Hard gale, with heavy rain.
1			Got the lower yards down; still lightly touching.
9	.....	W by N	
Noon			Noon. More moderate and cloudy.
P.M.	.....	W	P.M. Fresh breezes and cloudy.
1			Moderate; a cable and anchor received from the dockyard, and laid it out to the westward, for the purpose of heaving the ship off.
11	.....	Variable	Hove her off and secured her.
Midn.			Midnight. Light airs and cloudy weather.

Log of the Eclipse.

Extract from the Log of H.M. Brig ECLIPSE, Captain W. Steed, lying in Port Louis, Mauritius.—In *Civil Time.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, March 20, 1811. A.M. Strong breezes and clear weather; afternoon came on to blowing very hard.

Log of the Eclipse.

Extract from the Log of H. M. Brig ECLIPSE—*concluded.*

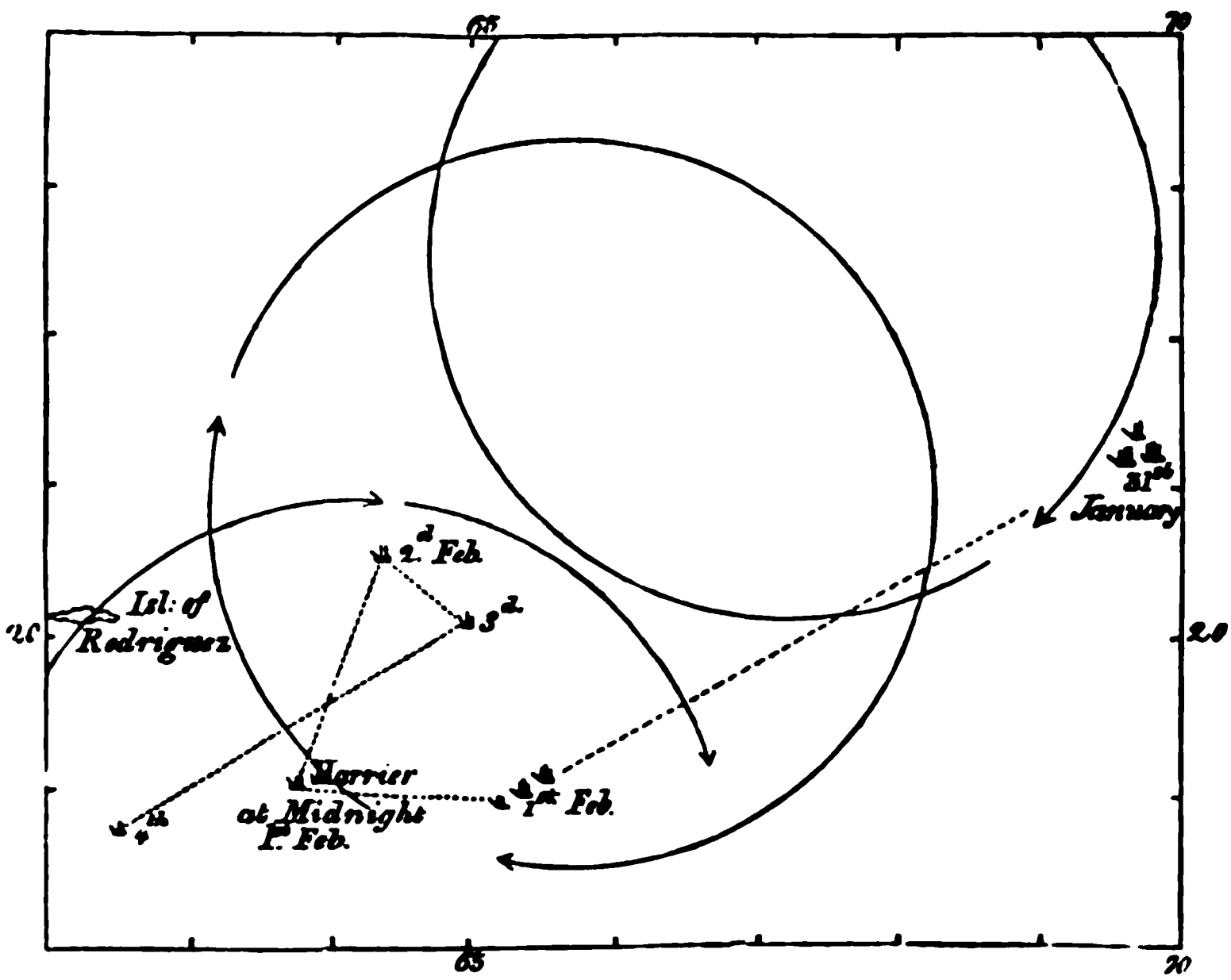
Hour.	Courses.	Winds.	Remarks.
			Thursday, March 21, 1811.
A.M.	.....	Variable	A.M. Begins blowing very strong, with constant rain; pilot brought an anchor to lay out a-stern.
P.M.			P.M. More moderate, with heavy rain.

The Blenheim's Storm, February, 1807.

Blenheim's storm.

The storm in which H.M. ships Blenheim and Java foundered, bears the same indications of a rotatory character with those already described in southern latitudes. The manner in which these ships met the hurricane, looks as if they had been sailing to the southward of it, and, plunging into its south-east side, received the wind from north-east.

The following figure is intended to represent how this may have occurred.



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Blenheim's storm.

The ships were sailing at the rate of nine or ten knots an hour. Some storms, as for example that of 1821, traced by Mr. Redfield, certainly move along no faster than the rate of seven miles an hour; ships may therefore overtake such storms.

The Harrier, brig of war, the same which foundered in the Culloden's storm, was the only vessel out of three which survived on this occasion. She was in company with the Blenheim and Java up to the evening of the 1st of February, 1807, at which time all three were in the greatest distress. The Blenheim was the flag-ship of the late Rear-Admiral Sir Thomas Troubridge.

The log of the Harrier, from the 1st to the 4th of February, is printed in detail; and in it will be found the last recorded signals from the Blenheim.

On the morning of the 30th of January, these three ships had moderate weather, but it was cloudy; there was a heavy swell, and the wind was at north-east: at noon that day their latitude was 16° 34′ S., long. 71° 56′ E. In the afternoon of the same day, the log states the breeze to be freshening, the weather squally, and records various stays carried away. On the morning of the 31st, the Harrier was still carrying studding-sails; but there was "a very cross sea always rolling away some back-stay, top-gallant-sheet," &c.; and at noon of the 31st, their latitude was 18° 41′ S., and long. 69° 36′ E. During the afternoon (judging by the log) the weather became gradually worse. On the morning of February 1st, it is styled threatening; and from this period the log is given in detail. The brig scudded throughout; and if we follow her course, hour by hour, on the 2nd of February and forenoon of the 3rd, we find she sailed in a circle, completing three-

quarters of the revolution, in accordance with the supposed law of storms in the southern hemisphere. But the report from a single ship does not afford conclusive evidence, and I am not at present aware of any other vessel being in this storm. It is most probable that at Rodriguez the wind became south-west.

Blenheim's storm.

Extract from the Log of H. M. Brig HARRIER, Captain Justin Finley.

Log of the Harrier.

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Sunday, February 1, 1807.
1	9	4	S W	N E	A.M. Threatening weather; in third reef
2	9	6			of fore-topsail; heavy rain and the wind in-
3	9	0			creasing; sent the top-gallant-yards down; in third reef of main-topsail; hauled the mainsail up, and bent the storm-staysails and trysail.
4	9	0			Strong gales, with heavy squalls and rain.
5	9	4			Ditto weather; struck the fore-top-gal-
6	9	4			lant-mast; the wind still increasing, found
7	9	6			it dangerous to attempt striking the main-top-gallant-mast; the wind blowing so strong, sent all the small sails from aloft.
8	10	2			Strong gales, with heavy rain; Admiral
9	9	2			and Java in company.
10	9	0			Strong gales, with rain; handed the
11	9	0			mainsail; close-reefed the fore-topsail; people employed in clearing the ship and lashing the booms.
12	9	0			Noon. Heavy gales; Admiral and Java in company.
					Course, S 50° W, distance 225 miles.
					Lat. 21° 4′ S, long. 65° 11′ E.
					Rodriguez, N 80° W, 180 miles.
P.M.					
1	9	0	W S W	N E	P.M. Strong gales; in fourth reef main-topsail; the gale increasing, with a very heavy sea.
2	9	0			2.30. Hauled up the foresail and reefed
3	9	4			it; carried away the fore-topmast backstay, repeated the knotted, and spliced ditto.
					Blenheim and Java in company.
4	9	0	S W		The main-topsail-yard was carried away
5	9	0	S W by S	N E by N	in the slings, owing to the lift and brace giving way; endeavoured to furl the sail, in doing which William Mailtrott was blown from the yard and drowned; cut the sail from the yard. At 5.20, lost sight of the Admiral, in a very heavy squall, bearing N W by W, distant half a mile; and the Java, bearing N E by E, distant a quarter of a mile: at this time we were shipping a great

CHAP. VI.

Log of the Harrier.

Extract from the Log of H. M. Brig HARRIER—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Sunday, February 1, 1807.
6	9	4	SWbyW	NE by E	quantity of water. 5.30. The fore-topsail blew away from the fourth-reefed band; the gale still continued to increase, with most violent squalls of wind and rain, the vessel labouring very much, and the sea striking her in all directions very heavily; stove several half-ports in, and much water going below; kept the pumps continually going.
7	9	0	NNW	ESE	7.50. The main-royal-mast blew away; the gale increased to a hurricane, and, shifting round in tremendous squalls to the eastward, obliged us to keep before the sea.
8	10	0			
9	9	0			
10	9	4			
11	10	2			
12	10	0			

SIGNALS.

Last signals of the Blenheim.

Hour.	No.	By whom.	To whom.	
2	331	Blenheim	Java	The ship is overpressed with sail, and cannot keep her station on that account.
3	80	do.	General	To steer S W.
4	80	do.	do.	To steer S W by S. The Blenheim made another signal, which we could not make out.

Wind East.

Wind South.

Hour.	K.	F.	Courses.	Winds.	Remarks.
A.M.					Monday, February 2, 1807.
1	10	0	W	E	A.M. At this time we shipped a great quantity of water, which washed a great quantity of the shot-boxes to pieces.
2	10	2	W by N ½ N	E by S ½ S	2.10. The wind flew round from east to south in a most tremendous squall; kept right before it; a great quantity of water in the waist, so as to affect the vessel's steerage very much; most of the starboard ports either stove in or washed out, as also many of the larboard ones; the squall still coming on with greater violence, and a most enormous sea.
3	10	4	WNW	ESE	At 3, the fore-staysail blew away. 3.49. Shipped two seas, which filled the waist and waterlogged the brig for some minutes, which caused her to broach-to; endeavoured to get the fore-sheet aft, but the foresail blew away from the yard, leaving the reef; she went off, but did not rise to the sea; the waist being full of water, a great quantity going forward she settled down by the head; sounded the well, found it increased from 12 to 30 inches in two minutes; hove
4	9	0	NW	SE	
5	9	0	NNW	SSE	
6	9	0	W by N	S by E	
7	9	0			
8	9	0	N	S	

Log of the Harrier.

Extract from the Log of H. M. Brig HARRIER—*continued.*

Hour.	K.	F.	Courses.	Winds.	Remarks.	
					Monday, February 2, 1807.	
A.M. 9	9	0			the four foremost guns overboard, which relieved her much; hove overboard all the round and canister shot on deck; a great quantity of water having lodged in the wings between decks, got up all the old rope and some shot, and threw it overboard; the water in the waist flew with such violence from side to side as to wash the studding-sails and hammock-cloths, which were lashed under the booms, about the deck, and in consequence went overboard; washed overboard the starboard-binnacle and compass. At daylight, blowing most violently, employed in clearing the deck and splicing the rigging that was chafed through and cut in the night.	
10	8	4				
11	9	0				
12	9	0			Noon. Strong gale. Course, S 67° W; distance 114 miles Lat. observed, 19° 29′ S, long. 64° 26′ E. Rodriguez, S 84° W, 64 miles.	
P.M. 1	9	4	N	S	P.M. Strong gales and cloudy; carpenters employed stopping up the ports; got the old main-topsail-yard on deck and the remains of the old foresail, and bent the new one.	
2	9	4				
3	9	0				
4	9	0			Ditto weather. 4.40. Reefed the foresail.	
5	8	6			Strong gales, with squalls; sent the top-gallant-mast down on deck.	
6	9	0			More moderate; the vessel labouring very much and shipping great quantities of water; strong gales and cloudy weather.	
7	9	0				
8	7	4				
9	7	2	ENE	WSW	Ditto weather.	
10	7	0			Ditto weather.	
11	7	0	E	W		Wind West.
12	7	0			Strong gales and cloudy; the sea much agitated.	
					Tuesday, February 3, 1807.	
A.M. 1	5	0	E	W	A.M. Strong gales and cloudy, and very heavy sea running.	
2	5	0				
3	5	0				
4	5	0			Ditto weather.	
5	2	4	SE	NW	Fresh gales and cloudy; set the main-staysail, trysail, and mainsail; bent a new fore-topsail; employed rigging spare main-topsail-yard.	
6	3	0	S	Variable		
7	4	0	SW	N		Wind North.
8	4	0			Ditto weather; split the mainsail.	
9	7	6				
10	8	0			Moderate and cloudy.	
11	6	0				
12	8	0	SWbyW	NE	Moderate, with small rain. Course, N 22° E, distance 110 miles. Lat. 19° 42′ S, long. 65° E. Mauritius, S 83° W, 740 miles.	

CHAP. VI.

Log of the Harrier.

Extract from the Log of H. M. Brig HARRIER—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Remarks.
P.M.					Tuesday, February 3, 1807.
1	7	6	S W	N E	P.M. Moderate and cloudy.
2	8	0			
3	7	4	SW b W		
4	7	4	S by W		Ditto weather.
5	7	2	S S W		Pointed the main-top-gallant-mast; in third reef main-topsail.
6	7	2	SW b W		Ditto weather.
7	7	4	SW b S		
8	7	0			Moderate, with small rain.
9	7	0			9.20. Hauled down the main-topmast-staysail.
10	7	0			
11	8	4			
12	7	6			Ditto weather.
A.M.					Wednesday, February 4, 1807.
1	..	..	SW by S	N E	A.M. Moderate, with small rain.
2	..	..			
3	..	..			
4	..	..			Fresh gales and cloudy, the vessel rolling very much.
5	..	..			
6	..	..			
7	..	..			Furled the mainsail; in third reef of main-topsail.
8	..	..			Windy looking weather, and the sea running very fast.
9	..	..			
10	..	..			
11	..	..			
12	..	..			Noon. Ditto weather, & a very heavy sea. Lat. 21° 18′ S., long. 62° 31′ E. Cape of Good Hope, S 71° W, 2440 miles.
P.M.					
1	..	..	SW by S	N E	P.M. Strong gales and squally; got the top-gallant-masts down on deck, close-reefed the topsails, and furled the fore-topsail.
2	..	..			
3	..	..			
4	..	..			
5	..	..			Strong gales and heavy rain; got the jib-boom in, and the spritsail yard fore and aft.
6	..	..			
7	..	..			
8	..	..			
9	..	..		E	Squally weather; thunder and lightning in the south-east quarter.
10	..	..			
11	.	..			
12	..	..			Ditto weather; a cross sea running.

The Ship Bridgewater.

Bridgewater's hurricane.

The H.E.I.C.S. Bridgewater, commanded by Captain Maunderson, encountered a severe hurricane in March, 1830, about lat. 20° 55′ S., and long. 90° E., another instance in proof that these storms are not always to be avoided on the homeward voyage from

India, by keeping a course "well to the eastward of Mauritius," as has been supposed by many to be the case. The Bridgewater, sailing to the westward, met the storm with the wind blowing at *north-east*, and when it abated the wind was at *north-west*, but the intermediate points not being stated, a copy of the log has not been inserted here. By it we find that a heavy swell from the northward preceded the storm. On the 2nd of March, the barometer was at 29.75. On the 4th, the wind being easterly, the ship hove-to on the larboard tack under the trysail, until that blew to pieces; after which she hove-to under bare poles, heaving her guns overboard. The barometer fell until it was at 28.80, with the wind increasing in violence, so that the ship was in much danger of foundering. After this gale, the Bridgewater was left with only her foremast, and the stump of her mizenmast.

Bridgewater's hurricane.

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*The Ship Neptune.**

The ship Neptune is another instance of a vessel, on her returning voyage from India, falling into a hurricane where she receives the wind at north-east: an extract from her log is annexed.

The ship Neptune.

A painting of the Neptune was made by Mr. Huggins, under the superintendence of her commander, Mr. Broadhurst, who assures me the picture does not give an exaggerated representation of the state of his ship. The sketch here added was reduced by the painter himself. The ship appears to have sailed onwards until she was dismasted, and then perhaps dropped out of the hurricane, by being disabled, and left behind as the tempest proceeded on its course.

* See "The Progress of the Development of the Law of Storms," page 35.

CHAP. VI.

Log of the Neptune.

Extract from the Log of the Ship NEPTUNE, from Calcutta towards the Cape of Good Hope, Captain Alfred Broadhurst.—In *Nautical Time*.

Hour.	K.	F.	Courses.	Winds.	Bar.*	Ther.	Remarks.
P.M.							Saturday, January 31, 1835.
1	6	4	W by S	N Eastly	29.86	81	P.M. Breezes, with rain; very heavy swell from the N W; ship very uneasy.
2	6	4					
3	6	0					
4	6	0					
5	6	4					
6	6	4					
7	6	4					
8	6	4					
9	6	4					
10	6	0					
11	6	0					
12	6	0	....	N N E			
A.M.							
1	5	0	W by S				
2	5	0	....	N N W			A.M. Taken a-back, with a smart squall at N W; carried away the boom-iron on the starboard fore-yard-arm.
3	3	0					
4	4	0					
5	4	0					
6	5	0	....	N			Much rain.
7	4	0					
8	4	0					
9	4	0					
10	4	0					Course S 63° W, dist. 121 m.
11	3	0					Dept. 109 miles.
12	3	0	....	....	29.82		Lat. 22° 30′ S, long. 68° 20′ E.
P.M.							Sunday, February 1, 1835.
1	3	0	W ½ S	North^ly.			P.M. Cloudy, with heavy north-westerly swell; wind increasing, latterly with a very heavy swell at north-west; the ship rolling and labouring very heavily.
2	3	4					
3	2	0					
4	2	4					
5	2	4					
6	2	4					
7	2	4					
8	2	4					
9	3	0					
10	3	0					
11	4	0					
12	5	0	....	E			Midnight. Fresh breeze, and sea getting up.
A.M.							
1	5	0	W ½ S				
2	5	0					
3	5	0					
4	5	0					
5	6	0					
6	6	0					
7	7	0					
8	7	0					
9	7	0					

* The barometer on the previous day had been 29.98 inches.

Log of the Neptune.

Extract from the Log of the NEPTUNE—*continued.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M.							Sunday, February 1, 1835.
10	7	0	S b W ½ S	E			Altered course to ease the rolling.
11	7	0					
12	7	0	....	....	29.77	80	Course, S 67° W, dist. 111 m. Dept. 102 miles. Lat. 23° 36′ S, long. 66° 23′ E.
P.M.							
1	7	0	W by S	E N E			Monday, February 2, 1835.
2	7	4					
3	7	0					P.M. Fresh easterly breeze and hazy.
4	7	0	....	....	29.74		
5	7	4					Wind increasing, with a heavy sea from N E; down royal yards, hauled top-gallant-sails, double-reefed the mizen-topsails, and got everything as snug as possible aloft; battened down the hatches.
6	7	4	....	....	29.72		
7	7	4	....	....	29.70		
8	8	0					
9	8	0	....	....	29.68		
10	8	4					
11	8	4	....	....	29.62		
12	9	0	....	....	29.55		Midnight. Fresh gales, with frequent hard squalls and heavy rain; sea running very high and cross; ship labouring heavily; handed the foresail.
A.M.							
1	9	0	W by S	E N E	29.50		
2	9	4	....	....	29.45		At 2, gale increasing; the ship labouring violently, and shipping a great quantity of water.
3	9	0	....	....	29.42		
4	8	0	....	....	29.40		At 4, gale still increasing; turned the hands out to take in the topsails; a furious squall from N N E split the fore and main-topsails, and carried away every vestige of running rigging. By daylight it blew a most furious hurricane, every sail blown from the yards, although the courses were secured by extra gaskets and studding-sail-tacks. The hurricane still increasing with tremendous fury, the sea running terrifically high, causing the ship to labour in a most violent manner: at times the lee-side and hammock-nettings completely buried in the water for some minutes; found the water increasing in the well to 30 in.
5	0	0	N to N W	E N E	29.35		5.30. Shipped a very heavy sea on the larboard side, and the immense weight of water rushing over the fore hatches tore off the tarpaulin, and a very large quantity of water got below into the lower deck, before the hatches could be

CHAP. VI.

Log of the Neptune.

Extract from the Log of the NEPTUNE—*continued.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M. 5	0	0	N to NW	E N E	29.35		Monday, February 2, 1835. secured again; an old sail, three times doubled, and an extra tarpaulin, were quickly battened over them.
6	0	0	....	....	22.30		At 6, a heavy blast blew away the fore-topmast, the jib-boom, and the spritsail-yard; the water in the well increasing on us.
7	0	0	....	....	29.25		At 7, the main-topmast was blown over the side, and, capsizing the maintop along with it, carried away all the futtock-shrouds on the starboard side, and started it up from the trussel trees. With the heavy rolling of the ship, filled both the quarter-boats, which were torn clear away from the davits.
8	0	0	....	....	29.20		
9	0	0					
10	0	0	....	....	29.18		At 10, blowing a most furious hurricane between E and N, and the sea at times making a complete breach over us; and we were apprehensive, from the continued quantity of water in the well, that the ship would go down.
11	0	0	....	....	29.16		

Situation of the Neptune, on the 2nd of February, at 10 a.m. From a painting by Huggins, executed under the direction of Captain Broadhurst.

Extract from the Log of the NEPTUNE—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M. 12	0	0	N to NW	E N E	29.15		Monday, February 2, 1835. Noon. A slight lull; sent hands aloft to cut and clear away the wreck.
P.M. 1	0	0	up N W off W	E N E			Tuesday, February 3, 1835. P.M. Gale still blowing, with great violence.
2	0	0					At 2, the hurricane suddenly abated, and it soon fell calm, causing the ship to labour dreadfully.
3	0	0					
4	0	0	head fr.S to SE	E N E	29.10		At 4, with dark, dismal appearance and constant rain.
5	0	0	....	....	29.10		At 5, calm; a heavy sea struck us, and stove in the quarter-gallery.
6	0	0	....	....	29.10		
7	0	0	....	....	29.10		
8	0	0	....	....	29.10		At 8, a fresh breeze sprung up from the W, and blew hard.
9	0	0	....	....	29.12		
10	0	0	....	....	29.15		
11	0	0	....	....	29.18		
12	0	0	....	....	29.20		
A.M. 1	0	0	head fr.S to SE	E N E	29.20		
2	0	0	....	....	29.30		A.M. At 2, more moderate.
3	0	0	....	....	29.30		
4	0	0	from SW b W	....	29.40		Moderate, and the sea going down; held a consultation with the chief officer, and, considering it impracticable to run for the Cape, considered it best to run for the Isle of France, to repair.
5	0	0	to S by W	....	29.45		
6	0	0	....	....	29.60		
7	0	0					
8	0	0	....	....	29.75		
9	0	0					Wednesday, February 4, 1835. Lat. observed, 24° 29′ S. A.M. Chron. 64° 35′ E. Bar. 30.10. Ther. 78°.
10	0	0	....	....	29.90		
11	0	0					
12	0	0	...	....	29.90		Thursday, February 5, 1835. Bar. 30.15.

The Ship Ganges.

CHAP. VI.

The Ganges crossed the equator on the 31st of December, 1836, and had scarcely entered upon south latitude before she experienced bad weather, which continued until the 7th of January, on which day she had a gale. By the log of the Ganges it will be seen that the Thalia, of Liverpool, was dismasted not far from this ship; and the log is printed because it may, perhaps, be the means of tracing a hurricane nearer to the equator than has been yet done.

Log of the Ganges.

Extract from the Log of the Ship GANGES, Capt. A. Broadhurst, from the Mauritius towards St. Helena.—In *Nautical Time*.

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
P.M.	..	..	....	....	29.83	83	December 31, 1836. P.M. Light, variable breezes. Lat. 0° 10′ N, long. 83° 6′ E.
			SE by S	W N W^{ly}	29.80	82	January 1, 1837. P.M. Variable throughout, with some squalls and rain. Lat. 0° 20′ S, long. 83° 1′ E.
P.M. 1	..	..	S by E	North^{ly}	29.75	82	January 2, 1837. P.M. Squally; wind variably northerly and north-westerly; hard squalls and heavy rain; latterly, a large, confused sea; ship labouring and straining violently, and shipping much water.
9	..	..	....	N W			
10	..	..	S S E				
11	..	..	....	N W^{ly}			
A.M. 1	..	..					A.M. At 1.30, heavy squalls; split the fore-topsail; furled it; ship lurching heavily and shipping much water. At daylight, more moderate; hoisted the main-topsail, and set the jib.
8	..	..	....	N W			At 8, violent squalls; wind N W, with heavy squalls; split the jib in hauling it down. Lat. 3° 6′ S, long. 83° 42′ E.

Extract from the Log of the GANGES—*continued.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
							January 3, 1837.
P.M. 1	..	..	S	N W	29.79	80	P.M. Fresh breeze.
4	..	..					Hard squalls.
10	..	..					At 10, frequent hard squalls and heavy rain; throughout a high, confused sea; ship labouring violently.
A.M. 1	..	..					A.M. At 1, light breeze and fine; less sea.
4	..	..					At 4, squally and rain.
6	..	..					At 6, moderate; less sea.
Noon.	..	..	....	N W			Noon. Squally. Lat. 4° 14′ S, long. 83° 52′ E.
							January 4, 1837.
P.M. 1	..	..	S	N W	29.79	80	P.M. Squally.
3	..	..					At 3, hard squalls.
Midn.							Midnight. Moderate and cloudy; a high sea on.
A.M. 2	..	..	S S E				A.M. At 2.30, hard squalls from the N W; in all sail but topsails.
3	..	..					At 3, moderate; hoisted topsails again; the weather throughout this log has had a very gloomy, suspicious appearance, but the barometer continues steady. Lat. 6° 3′ S, long. 83° 53′ E.
							January 5, 1837.
P.M. 1	..	..	S	....	29.77	80	P.M. Hard NW squall and heavy rain; a high, confused sea; ship lurching heavily.
4	..	..	....	N N W			
7	..	..					At 7, lightning in the southward.
11	..	..					Hard NW squall, heavy rain.
A.M. 1	..	..					A.M. At 1, squally, with constant, heavy rain.
4	.	..	....	SW light			
6	..	..					At 6, moderate; made sail.
11	..	..	....	N W			Cloudy, threatening appearance. Lat. 7° 50′ S, long. 84° E.
							January 6, 1837.
P.M. 1	..	..	....	N W^{ly}	29.70	82	P.M. Moderate breeze, increasing with strong N. Westerly squalls.
A.M. 2	..	..					A.M. At 2, in top-gallant sails and jib; handed the mainsail.
5	..	..	....	N W			At 5, squally; heavy sea.

CHAP. VI.

Log of the Ganges.

Extract from the Log of the GANGES—*continued.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M. 9 Noon	..	..	S	N W	29.70	82	January 6, 1837. At 9, squally; heavy sea. Noon. The weather having a very threatening appearance, and the barometer falling, down top-gallant masts and yards on deck, and housed the mizen-topmast, as I am now apprehensive of a hurricane. Lat. 9° 38′ S, long. 84° 9′ E.
P.M. 1	..	.	S	W N W	29.60	82	January 7, 1837. P.M. Increasing, with very suspicious, threatening appearance, a high sea, and the ship labouring violently; barometer at 3 P.M. 29.60, and falling; pumped ship eighteen inches; handed fore-topsail, and rounded two under the main one.
4			Head fr. W by S				
4	..	..	....	N N W			At 4, heavy squalls; handed main-topsail and secured all sails with extra gaskets.
6	..	..	....	N N W			At 6, blowing hard, with furious squalls and heavy rain and a high sea.
Midn.							Midnight. Blowing a heavy gale, with a high, cross, confused sea; ship labouring heavily.
Day^{lt}							Daylight, heavy gale and violent squalls.
Noon							Noon. Ditto weather; the barometer fell to 29.55, which was the lowest, and it rose towards noon to 29.60. Lat. 10° 15′ S, long. 84° 21′ E.
P.M. 1 to 5	..	..	SW b W to SW b S	N W	29.70	81	January 8, 1837. P.M. Hard N W gale.
6	..	..	S				At 5, more moderate. At 6.30, bore up south, and set the foresail to ease the violent motion of the ship.
Midn.							Midnight. More moderate and less sea.
Day^{lt}							Daylight, moderate, with dark, squally, threatening appearance.
A.M. 6	.	..	S by W				A.M. At 6. During the forenoon the weather still looks suspicious and the barometer has hastily risen. Lat. 11° 10′ S, long. 84° 30′ E.

Log of the Ganges.

Extract from the Log of the GANGES—*concluded.*

Hour.	K.	F.	Courses.	Winds.	Bar.	Ther.	Remarks.
P.M. 1	..	..	S by W	N N W	29.73	80	January 9, 1837. P.M. More moderate; a high, cross, confused sea.
5	..	..					Moderate and fine; swell unabated; set the main-topsail double reefed. Lat. 13° 4′ S, long. 84° 22′ E.
P.M. 1	..	..	SW by S	North'y	29.76	84	January 10, 1837. P.M. Light breeze, decreasing latterly, but squally appearance; a heavy, confused swell throughout. Lat. 14° 7′ S, long. 84° E.
			S W b S	Variable	29.78	84	January 11, 1837. Light airs and fine, with confused swell. Lat. 14° 17′ S, long. 83° 40′ E.
					29.78	84	January 12, 1837. Light airs and calm. Lat. 14° 26′ S, long′ 83° 43′ E.
P.M. 5.45	..	..	....	S S E	29.80	83	January 13, 1837. P.M. At 5.45, saw a ship S by E; standing north as we neared her, observed she had lost her mizenmast and topmasts; backed the mainyard to speak to her, and to offer her assistance.
6	..	..					At 6, spoke the stranger, the Thalia, of Liverpool, bound to Calcutta; informed us she had lost her masts in a violent hurricane on the 7th inst. (the day we had the gale), in lat. 12° S, long. 85° E; she had been hove-to under bare poles for nine hours before her masts were blown away; she was going tight and all well; offered to render assistance, but it was not required. Lat. 16° S, long. 82° 10′.

Met the Thalia.

CHAP. VI.

In this Chapter several examples have been given, in succession, in which ships seem to plunge into the storms on their east side; and the orders of the Dutch East India Company, which are quoted by Horsburgh in his sailing directions, would appear to have reference to ships encountering rotatory gales in this manner. Horsburgh's statement is as follows: "When the wind, at south-east, or east-south-east, shifted to north-eastward, the Dutch commanders were directed by the Company to take in the mainsail. If lightning appeared in the north-west quarter, they were to wear and shorten sail; for in the first case they expected a hard gale at north-west; and, if lightning was seen in that direction, they thought the gale would commence by a sudden shift or whirlwind, which might be fatal if taken aback."—*East India Sailing Directions*, vol. i. p. 83.

CHAPTER VII.

ON TYPHOONS IN THE CHINESE SEA, AND ON THE HURRICANES OF INDIA.

Typhoons in the Chinese sea.

This Chapter will contain such accounts of Typhoons in the China seas as I have been able to procure. They are neither in sufficient number nor sufficiently connected to be satisfactory: so far as they go, however, they exhibit the same character as the storms of north latitude already traced; and they may serve to create an interest for more extensive inquiry into the subject.

The H. C. S. Bridgewater,* Captain Maunderson, was lying at Canton on the 9th of August, 1829, when she was driven on shore by the violence of the wind, and obliged to cut away her masts. At the commencement of the hurricane the wind was northerly, veering to the *east*, then becoming *east-south-east*, and ending at *south-east;* by which it may be inferred that the ship was in the northern or right hand semicircle of this storm.

At the same period the H. C. S. Charles Grant was approaching Canton from the southward; and on the night of the same 9th of August, we find by her log, she had the wind in the opposite direction, with squalls and rain, and that she struck her royal masts and yards, and split her main-topsail. It may be supposed she was in the southern or left-hand portion of the same storm.

* The same ship as that mentioned at page 260.

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Typhoons in the Chinese sea.

The barometer, on board the Bridgewater, fell to 29.17; on board the Charles Grant it fell to 29.40. The longitude of this last ship is not given; but we may presume she was on or near the same meridian as Canton.

Log of the Bridgewater.

Extract from the Log of H.C.S. BRIDGEWATER, Captain Maunderson, lying at Canton in China. Lat. 22° 41′ N.; long. 113° 46′ E.

Hour.	Courses.	Winds.	Bar.	Remarks.
				August 9, 1829. Linten Peak, N ½ W about 4 miles; Peak of Lantoa, S E. West point of Tungcoa, N E by E ½ E.
A.M. 2		Northr^ly		Wind, first part variable, from the northward, and squally. A.M. Gave the ship half the cable service.
3	....	....	falling	Weather still squally; wind increasing, and barometer falling quickly.
7			quickly	Struck top-gallant-yards; lowered the masts, and gave her the whole cable.
8	....	....	29.30	Barometer, 29.30, and on the decline; got the flying-jib-boom in.
9	....	Easterly		Blowing hard, and veering to the eastward. Found the ship driving. Let go the small bower, and brought up with two anchors a-head.
10	....	E S E		Wind E S E with violent gusts, in one of which parted the small bower; dropped the sheet, and veered away upon both cables; brought the ship up with four cables.
Noon	....	....	29.17	Noon. Barometer 29.17, with very thick weather. Typhoon still increasing. Hove in the small bower-cable which had parted, and bent it to the spare anchor; prepared to strike the lower yards & topmasts; the ship again driving, and being in only four fathom water, near the edge of Linten Sand & seeing no chance of bringing the ship up, Captain Maunderson consulted with the first and second officers, when it was deemed absolutely necessary to cut away the masts to save the ship, which was done instantly. Let go the spare anchor. The ship now brought up in 3½ fathom on soft mud.
P.M. 2				P.M. Wind decreasing.
Midn.				Midnight. Moderate.
				August 10, 1829.
A.M. 1	....	S E		Wind S E, with passing squalls and rain.

Log of the Charles Grant.

Extract from the Log of H. C. S. CHARLES GRANT, from England towards China.

Hour.	Courses.	Winds.	Remarks.
			Saturday, August 8, 1829.
A.M.			
1	....	E by S	A.M. Hazy.
6			Light airs.
8			Light airs, S by W in the first part; middle easterly airs and calms; in the latter an increasing breeze at N W.
10			Light airs and calms.
P.M.			
3	....	W by N	
9	....	NW b W	P.M. Cloudy.
			A.M. Scrubbed hammocks, and washed the gun deck; Lady Melville in company.
			Lat. observed, 17° 35′ N.; Bar. 29.55; Ther. 85°.
			(Signed) JOSEPH COATES.
			Sunday, August 9, 1829.
A.M.			
1	....	N W	A.M. Fresh breezes.
3			Cloudy.
5			In first and second reefs topsails.
11	....	N W b N	Rain.
12			Midnight. Handed fore and mizen topsails.
P.M.			
1	....	W	
3			Throughout a strong breeze and cloudy weather, with squalls and rain.
4	....	W by S	
6			Struck royal masts and yards.
8			Up foresail.
10			Split the main-topsail; shifted with the second best.
			Lat. observed, *none;* Bar. 29.40; Ther. 83°.

The Raleigh's Hurricane.

A storm passed over the same place on the 5th and 6th August, 1835; and in the "Asiatic Journal" there is the following short account of it.

"A typhoon was experienced in the China Seas on the 5th and 6th August, 1835, during which the following vessels suffered:—

"The Danish brig Maria, totally wrecked on Pootoy.

"H. M. S. Raleigh, Captain Quin, dismasted, and in great danger of foundering.

"British brig Watkins, Whiteside, dismasted under Lantao.

"Brig Governor Finlay, Kenedy, dismasted among the islands.

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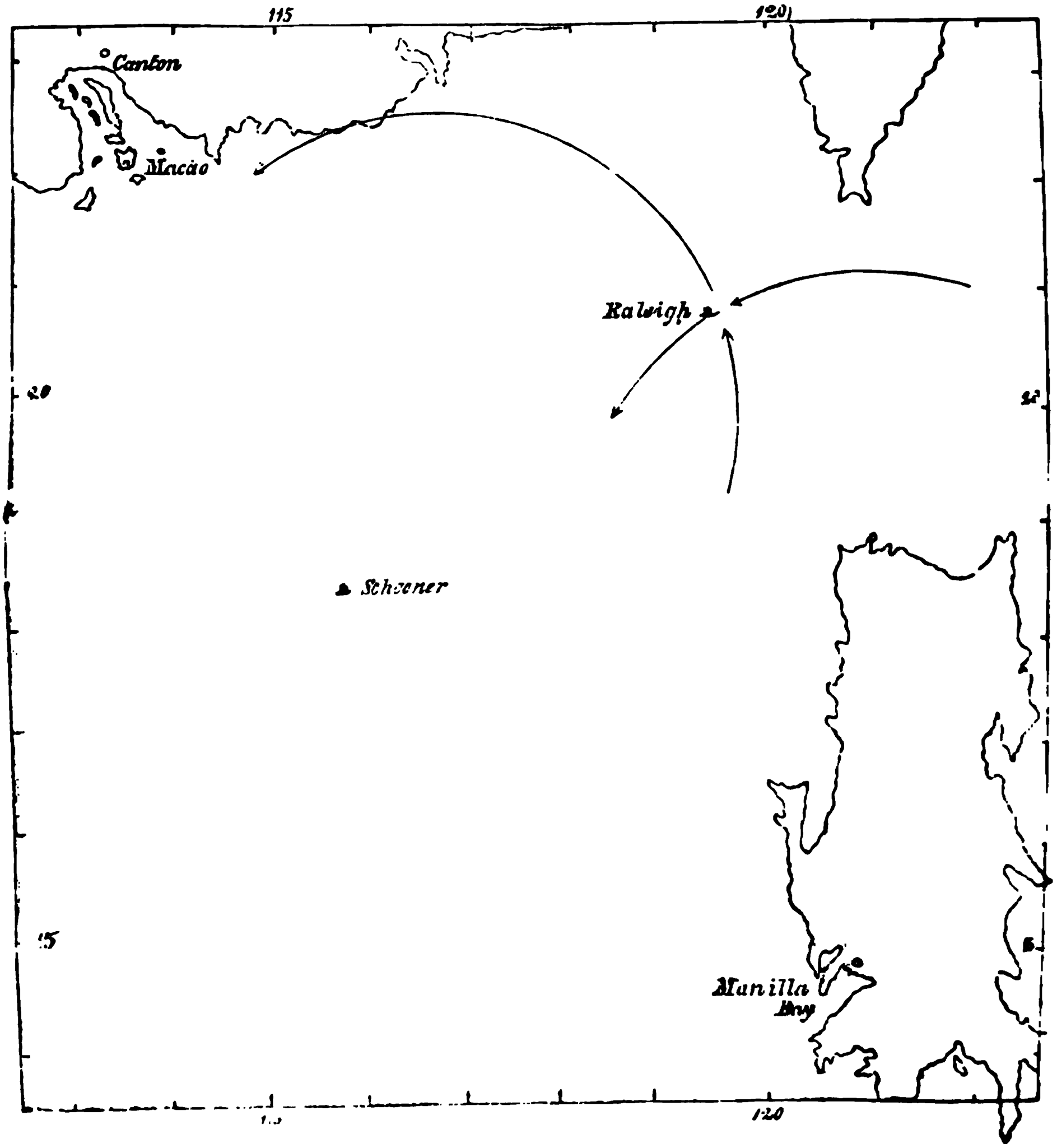
The Raleigh's hurricane.

"Brig Cœur de Lion, Glover, on shore on the Typa.

"American brig Kent, dragged her anchors in the Cumsingmoon, and was carried by the swell one mile over a ledge of rocks.

"Many Chinese junks have been dismasted; many houses in Macao have been greatly damaged; and many lives lost in the inner harbour, where many vessels were also driven on shore."



The Raleigh's hurricane.

The Raleigh sailed from Macao on the 1st of August, 1835. On the 4th, the barometer was falling; and in the afternoon, the wind veered round to the N.N.E., when the storm set in. The barometer continued to fall until it was at 28.20, and soon after this the ship upset. The master's log speaks of the vessel as being "keel out;" and the greater part of the officers and ship's company were upon the weather *larboard* broadside for twenty minutes.

A three masted schooner, commanded by Mr. Bennett, met with this hurricane, on the 5th of August, in lat. 18° 2′ S., and long. 115° 50′ E.: but this schooner's log has not yet arrived from India.

Log of the Raleigh.

Extract from the Log of H. M. S. RALEIGH, Captain Quin, at anchor in Macao Roads, from whence she sailed on the 1st of August, 1835.—In *Civil Time*.

Hour.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M.					August 4, 1835.
1	....	Variable			
8	....	N by E	29.60		Barometer 29.60, and falling; in fore and main-top-gallant-sail.
10					Close-reefed topsails and courses.
Noon	....	....	29.45		Down top-gallant-mast and yards.
12.30					Barometer fell from noon .15; took in sail as usual.
5	....	Northly			Split the fore-staysail.
P.M.					
7.30	....	SE			The wind veered round to NNE, when a heavy typhoon commenced.
8	....	NNE	29.36		Ship, falling off, made a lurch, and took in so much water that had not the hatches been battened down, the consequences must have been fatal; it was with the greatest difficulty she righted: typhoon increasing, unbent main-trysail.*
10	....	NE			At 10, P.M., close-reefed the fore-trysail and set it; typhoon veering gradually round to ENE, with a heavy sea.

Hurricane commences.

* Portions have been omitted, which only relate to taking in sail.

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Log of the Raleigh.

Extract from the Log of H. M. S. RALEIGH—*concluded.*

Hour.	Courses.	Winds.	Bar.	Ther.	Remarks.
A.M. 11 Midn.	....	....	29. 04		August 4, 1835. Ship making such dangerous lurches, in fore-trysail: typhoon increasing.
A.M. 2	....	E by N			August 5, 1835. At 3, typhoon veered round to E S E, still increasing in violence; and at 3, the barometer 29.5 and falling; at 6.30, barometer falling from 28.30 to 28.20, commenced throwing carronades, slides, and shot overboard; at 8 A.M. typhoon increasing, relieved ship of remaining carronades, except the 7th carronade larboard. (The cutter on larboard quarter held so much of typhoon, and fearing the boat might be forced up the mizen rigging, or fall in-board and increase ship's danger, cut her away.) At 9.30, the ship made a very deep lee lurch, and at the same time was struck by a heavy weather sea; the typhoon blowing, if possible, with still greater fury; the ship went over, and carried away both wheel ropes and relieving tackle; in this awful situation, the ship lay for about twenty minutes, with the major part of officers and ship's company on her weather larboard broadside, who, with the most praiseworthy coolness and activity, succeeded in cutting the lanyards of backstays and lower rigging; 9.50, the masts and bowsprit went by the board, and H. Majesty's sloop righted, with four feet water in her hold. Lat. 20° 44′, long. 119° E. People employed clearing the wreck. Observed the typhoon to moderate a little. At 6, typhoon more moderate, strong gusts of wind, with a heavy sea from the southward. The pinnace and second gig were cut a-drift, and floated out of the ship while she was on her beam ends, or more properly speaking, *keel-out*; all anchors saved, two long guns 9-pounders, one 32, and one 12-pounder carronades, and a jolly-boat on the poop larboard side saved; but in all other respects, a clean sweep on her upper deck.
3	....	E S E	29. 05		
5	....	S E	28. 30		
6.30	....	....	28. 20		
9. 30					
9.50					
10	....	S E ½ S			
Noon					
P.M. 1	....	S S E			
7	....	Southerly			

Centre of storm.

Since the first edition of this work was printed, Mr. Redfield has published some further accounts, relative to the Raleigh's Hurricane, which will be found at page 8 of the "Nautical Magazine" for January, 1839. I abstract from this account the following tables of the barometer, at Macao and at Canton. Canton is distant about sixty miles north of Macao. The difference in the fall of the barometer at these places is very remarkable, and strikingly indicates the greater depression near the centre of a hurricane.

August 5th.			August 6th.		
h. m.		Barom.	h. m.		Barom.
1. 0	A.M.	29.47	1.55	A.M.	28.30
3.30	P.M.	29.28	2. 0	„	28.37
5. 0	„	29.20	2.25	„	28.56
7.20	„	29.12	2.45	„	28.68
9. 0	„	29.08	3.10	„	28.75
10.20	„	28.95	3.40	„	28.83
10.45	„	28.90	4.10	„	28.90
11. 5	„	28.85	4.45	„	28.97
11.30	„	28.75	5.15	„	29.02
11.53	„	28.65	6. 0	„	29.08
			6.45	„	29.12
August 6th.			7.45	„	29.20
0.15	A.M.	28.50	8.15	„	29.21
0.30	„	28.40	8.45	„	29.23
0.45	„	28.30	9.30	„	29.27
1.20	„	(*lowest*) 28.05	10.25	„	29.30
1.25	„	28.08	11. 0	„	29.34
1.45	„	28.20	2. 0	P.M.	29.42

After which the barometer continued rising to 29.65, at which point it usually stands during fine weather.—*Canton Register, August* 15.

The following is an account of the state of the barometer and winds at Canton:

Hour.	Barom.	Wind.	
			August 4th.
9 A.M.	29.79	N.W	Fine weather.
4 P.M.	29.70	N. by W.	Moderate breeze.
			August 5th.
9 A.M.	29.62	N.&N.W.	Fair weather.
4 P.M.	29.54	Unsettled.	Rain and fresh breeze.
12 „	29.37	N.	Blowing hard and in heavy gusts.

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Hour.	Barom.	Wind.	
			August 6th.
5 A.M.	29.34	N.E.	Blowing hard with heavy rain.
9 „	29.51	S.E.	„ „ „
11 „	29.58	S.E.	Blowing hard,—moderating.
5 P.M.	29.70	S.E.	„ „ „
11 „	29.85	S.E.	„ „ „
			August 7th.
8 A.M.	29.94	S.E.	Cloudy.

By the Raleigh's log it is seen that her barometer began to fall at noon on the 4th of August; soon after which period the storm set in, at the place where she was. It was nearly twenty-four hours afterwards before the storm reached Macao. An American ship, called the Lady Hayes, under weigh not far from Macao, met the wind at north. This vessel then stood on a south-easterly course, with as much sail as she could carry; and she had the wind veering from north to west, and then to south.

Another American ship, called the Levant, which arrived at Macao on the 7th of August, coming from the southward, felt nothing whatever of this storm.

If the tracks of these typhoons are similar to those of the West India hurricanes, they will generally come to Canton from the direction of the Philippine Islands. An extract from the log of H.M.S. Crocodile is added; that vessel having experienced a hurricane in Manilla Bay, on the night of the 23rd of October, 1831.

An account, in the "Asiatic Journal," of this hurricane at Manilla, states that the young leaves of the "paddy fields" were turned yellow by the falling rain; and that some other fields of rice, either by the rise of the tide, or from the salt water, which the wind caught up and conveyed to them in showers, were completely whitened.

Log of the Crocodile.

Extract from the Log of H.M.S. CROCODILE, Captain R. Bancroft, at Manilla.—In *Civil Time*.

Hour.	Courses.	Winds.	Remarks.
			October 22, 1831.
A.M.	....	E N E	A.M. Light wind and cloudy.
P.M.			P.M. Light wind and fine; latter part, moderate breezes.
			October 23, 1831.
A.M.	....	N E	A.M. Light wind and cloudy.
P.M.			P.M. Moderate and cloudy weather.
			Sunset, increasing breeze and cloudy, veering more northward.
7			At 7, veered to seventy-five fathoms, and ranged the best bower.
8	....	N	At 8.30, the ship drove, let go the best bower; pointed yards to the wind, and struck top-gallant-masts; carried away the main-top-gallant-mast, by its being swayed through the cross-trees.
11			At 11, the typhoon very heavy and the sea high; at 11.20, the ship again drove, veered out the whole of the best bower, which brought her up; at this time the first gig was washed away from the quarter.
Midn.			At midnight, the hurricane very severe, with heavy rain and high sea; bent the sheet cable over all, not being able to get it out of the hawse-hole.
			October 24, 1831.
A.M.	....	N by W	A.M. Typhoon very heavy, with incessant rain and high sea.
1		N E	At 1.40, its extreme rage abated, and shifted to the N E; the sea became less violent, and the ship rode more easily; but very heavy squalls.

Colonel Capper's Whirlwinds.

The late Colonel James Capper's opinion, that hurricanes are vast whirlwinds, was formed during twenty years' observation and study of the subject, on the coast of Coromandel. In the preface to his work, published in 1801, he says, that when he first attempted an investigation into the winds in India, he had great doubts of success, from the number and variety of

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them: but as he proceeded, he found that there were many words to express the same thing, and that the hurricane, the typhoon, and the tornado were but English, Greek, or Persian, and Italian or Spanish names, for a whirlwind.

In classing the winds, he observes, "the tempest is, both in cause and effect, the same as the hurricane or whirlwind; and that the storm, or what the Englishman calls a hard gale, is likewise nearly the same." He also states, that it is a long standing error that hurricanes in India occur only at the changes of the monsoons; and that Dr. Halley must have been misinformed on that subject.

There is this difference in the observations of Colonel Capper and Mr. Redfield, that the former seemed of opinion that all whirlwinds are local and temporary, whilst Mr. Redfield has clearly shown that they are progressive. It is not improbable, however, that some storms are local, and end nearly at the same place where they began.

The accounts of those storms, quoted by Colonel Capper, extracted from "Orme's History," all occurred on the coast of Coromandel: but the reports given of some of the winds, though they may show that these hurricanes were whirlwinds, are not sufficiently detailed to enable us to determine their tracks, and from what directions (if they were not local) they came.

The following are extracts from Colonel Capper's work on the winds and monsoons.

Pondicherry hurricane, 1760.

"During the siege of Pondicherry, at the time of the N.E. monsoon, and on the 30th of December, 1760, the weather was fine in the evening; but a heavy swell rolled on the shore from

the south-east. The next morning the sky was of a dusky hue, accompanied by a closeness of the air; but without that wild irregularity which prognosticates a hurricane. Towards the evening, however, the wind freshened from the *north-west*, and at 8 at night increased considerably. About midnight the wind veered round to the *north-east;* fell calm with a thick haze; and, in a few minutes, flew round to the *south-east*, whence it blew with great violence. Almost all the ships might have been saved had they taken advantage of the wind blowing off the land; but the roaring of the wind and sea prevented the captains from hearing the signals for standing out to sea. The Newcastle and Protector were driven on shore, a few miles south of Pondicherry, and the crews were saved. The Norfolk, Admiral Stevens, returned next day; and on the 7th, came in the Salisbury, from Trinco, Trincomalee, south; and the Tiger, from Madras, north: so that in these opposite directions, of east, north, and south, the violence of the storm had not been felt.

Madras hurricane, 1773.

"The next in succession was that of 1773; on the 20th of October that year, many days after the north-east monsoon had apparently commenced, the wind began to slacken, and the clouds in the evening appeared uncommonly red, particularly on the day preceding the storm. On the morning of the 21st, a strong wind blew off the land; and, in the course of a few hours, flew all round the compass. At this time the Norfolk, man-of-war, Admiral Cornish, with the America and Weymouth, and the Princess Charlotte, country ship of 400 tons, remained in Madras Roads, with several other country vessels. The wind began to blow from the north-west, and continued from that quarter for three or four hours, of which time the men of war availed themselves to put to sea; but it then suddenly shifted to the *eastward*, and prevented most of the country ships from following their example. After having blown with incessant violence for fourteen hours, and with almost equal strength from every point of the compass, it at length ceased, but literally left only wrecks behind.

"All the vessels at anchor were lost, and almost every person on board perished; but the men-of-war and Princess Charlotte returned into the Roads on the 24th. The former had felt the gale very severely whilst near the coast, but without sustaining any material injury: the latter vessel likewise, from staying rather too long at anchor, had lost her fore and main masts, and was otherwise much damaged."

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From the Admiralty I obtained copies of the log-books of the Norfolk, the Salisbury, Tiger, York, and other ships of Admiral Stevens' squadron of 1760-1. At Pondicherry Roads this storm began about N.N.W., and ended about S.S.E.

The Tiger, as well as the Salisbury, York, and Weymouth, were all to the *southward* of Pondicherry, and were in different places within the influence of this storm; apparently showing that, like the others, it came from the direction of the equator, although it must have moved a little southerly at Pondicherry, by the wind veering from N.N.W. to S.S.E.

After accounts of other storms, Colonel Capper continues:—

"Ships which put to sea in due time very soon get beyond the influence of the hurricane to the eastward; and it is very well known that they never extend far inland. All these circumstances, properly considered, clearly manifest the nature of these winds, or rather positively prove them to be whirlwinds, whose diameter cannot be more than 120 miles; and the vortex seems generally near Madras or Pulicat. Those which happen in the north-east monsoon, generally fall with most violence within a few leagues of this place, and never, I believe, reach south of Porto Novo.

"But at the commencement of the south-west monsoon, violent gales are sometimes felt on the east side of Ceylon, and the southern extremity of the coast."

After describing a hurricane, encountered in south latitude by the Britannia, Indiaman, on the 10th of March, 1770, and explaining that it did not extend above 30 leagues, since the Britannia fell in with two ships which were within this distance, Colonel Capper proceeds:—"Thus then it appears that these tempests or hurricanes are tornadoes or local whirlwinds, and are felt with at least equal violence on the sea coast

and at some little distance out at sea. But there is a material difference in the situation of the sun when they appear at different places: on the coast of Coromandel, for example, they seldom happen, particularly to the northward, except when the sun is in the opposite hemisphere. On the Malabar coast they rage with most violence during the monsoon, whilst the sun is almost vertical. Near the island of Mauritius they are felt in January, February, and March, which may be deemed their summer months; and in the West Indies, according to Mr. Edward's 'History of Jamaica,' the hurricane season begins in August and ends in October."

In Colonel Capper's work, we find Franklin's explanation of what first led him to observe that the north-east storms of America came from the south-west. It is in a letter to Mr. Alexander Small, dated the 12th of May, 1760, and is as follows:—

Franklin.

"About twenty years ago, we were to have an eclipse of the moon at Philadelphia, about 9 o'clock; I intended to have observed it, but was prevented by a north-east storm, which came on about 7, with thick clouds as usual, that quite obscured the whole hemisphere; yet when the post brought us the Boston newspaper, giving us an account of the same storm in those parts, I found the beginning of the eclipse had been well observed there, though Boston is north-east of Philadelphia about 400 miles. This puzzled me, because the storm began so soon with us as to prevent any observation; and, being a north-east storm, I imagined it must have begun rather sooner in places further to the north-eastward, than it did at Philadelphia; but I found that it did not begin with them until

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near 11 o'clock, so that they had a good observation of the eclipse. And, upon comparing all the other accounts I received from the other colonies, of the time of the beginning of the same storm, and since that of other storms of the same kind, I found the beginning to be always later the further north-eastward."

Whilst introducing the above paragraph, Colonel Capper says, it affords us a proof that a current of air in America moved many hundred miles during a north-east storm, probably from the Gulf of Mexico to Boston. Thus, having stated his belief that hurricanes were whirlwinds, he was upon the point of showing also that they were progressive.

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*Bay of Bengal Hurricanes.**

Bay of Bengal hurricanes.

When hurricanes occur at the mouths of the River Ganges, the inundations of the sea, owing to the lowness of the alluvial land there, appear to be very disastrous; and also to be very frequent. On the 31st of October, 1831, during a hurricane, it is said, 150 miles of country were flooded, and 300 villages, with 10,000 persons, destroyed.

Hurricane, October 7, 1832.

The account of another hurricane, on October 7, 1832, being more detailed, is here reprinted from the "Asiatic Journal." It will be seen that the barometer of the ship London fell very nearly two inches on that day, off the mouths of the Ganges; whilst at Chandernagore it only fell half an inch. It may hence be presumed, as well as from the report of the wind, that the London was near the centre of the storm. The

* See "The Progress of the Development of the Law of Storms."

extract published in the "Asiatic Journal" is, however, not sufficient to enable the ship's track to be laid down. The veering of the wind in this storm will be observed to be precisely similar to that in the West Indian hurricanes; and the conclusion may be drawn, that this storm came from the Birman coast, and from the south-east.

Hurricane of the 7th October, 1832 *at the Mouth of the Ganges.*

At Chandernagore.

The storm of Sunday, 7th October, 1832, is described, in a letter from Chandernagore, as having been at one time, though fortunately not of long duration, almost terrific, from the appalling violence of the wind. The oscillations of the barometer are described as very remarkable.

	Inches.
The mean height on Saturday was	29.78
But, though the weather was evidently threatening, it had not fallen, on Sunday morning at 6 A.M., to more than	29.68
From this time, however, to 3.30 P.M., when it was at its lowest, it fell to	29.16
Remaining stationary only for about an hour, during which time the wind was at times tremendous.	
The barometer then rose again with such rapidity (the gale increasing from this time) that at 9 P.M. it was at	29.46
And at 2 A.M. on Monday at	29.62
At 9.30 again at	29.78
The wind at daylight on Sunday was	E. N. E.
At noon	East.
At 3.30 P.M. the gale was at its greatest height, and wind	E. S. E.
In the evening it was	S. E.
And at midnight	Calm.

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Extract from the "Asiatic Journal," relative to a Gale on the 7th October, 1832.

Log of the London.

Note made from the Log of the Ship LONDON, Mr. Wimble, Commander, between lat. 18° 26′ and 20° 23′; long. 86° 30′ and 90° East.

Hour.	Winds.	Bar.	Remarks.
			October 6, 1832.
A.M. 8	....	29.70	A.M. Cloudy weather.
12	....	29.50	Midnight. Squalls and raiu.
			October 7, 1832.
A.M. 8	N E	29.40	A.M. Squalls, with rain.
10	E N E		Strong gales.
Noon	....	28.90	Noon. Gales increasing.
P.M. 4	E by N	28.80	P.M. Fresh gales.
6	....	28.50	A hurricane.
8	....	27.80	Tremendous hurricane.
9	S W	28.10	Wind shifted to S W, and blew with increased violence.
10	....	28.20	Increased violence.
12	....	29.00	Midnight. More moderate.
			October 8, 1832.
A.M. 6	S W	29.30	A.M. Moderating.
Noon	....	29.50	Noon. Strong gales, high sea.

At Calcutta, during the same storm, the wind, commencing at *north-east*, veered to *east*, then shifted to *south-west*. The lowest point of the barometer at Calcutta was 29.20.

Hurricane of May 21, 1833.

The most severe storm of late occurrence at the mouth of the Ganges, is that of May 21, 1833, when the H. E. I. C. ship Duke of York was carried a great way inland and wrecked. An account of her loss was published soon after; but is now out of print, and no copy can be obtained.

In the Journal of the Bengal Asiatic Society, Mr. Princep (secretary to the society) has given a report of the barometer on board the Duke of York. The fall is

the greatest hitherto met with; exceeding two inches and a half: being a diminution, if correct, of one-twelfth of the whole atmospheric pressure.

Hurricane at the Mouth of the Hoogley, 21st May, 1833.

"The tide rose at the mouth of the river more than twelve feet above the ordinary springs of the season, sweeping over the land more than the eye could reach, destroying all the bunds and villages, with the population and cattle. At the lower station of Hidgelee and Balasore, the tide rose several feet higher than in the gale of October, 1831, which destroyed nearly 50,000 persons. The ground was strewn with the wrecks of houses, trees, and dead bodies.

"The accounts from Diamond Harbour state, that the whole country, as far as can be discerned, both up and down the river on both banks, was strewed with corpses of human beings and of the brute creation. The carcases of two or three tigers have been drifted to Diamond Port, besides many deer and cattle, and quantities of large fish.

"The gale, as in most of these cases, seems to have been confined within a small range, and to the vicinity of the land, as several ships, which arrived at Calcutta a few days after, had felt nothing of it."—*Asiatic Journal for Nov.* 1833.—See Inundation of Hidgelee and Balasore.

"At what is called the new tripod, the wind commenced at *south-east*."—*Ibid.*

An Account of the Gale of the 21st May, by JAMES PRINSEP, *Secretary to the Bengal Asiatic Society.*

"In the Meteorological Register for May, I noticed the great fall of the barometer which took place previous to, and during the severe gale that did so much damage at the mouth of the river Hoogley. I have since been favoured with an extract from the register of the barometer kept on board the H. C. S. Duke of York, one of the numerous vessels wrecked or stranded along the Hidgelee coast. This ship lay apparently in the line of the greatest force of the gale; and the depression experienced in the barometer, confirmed as it is by the indications of a sympiesometer on board, gave us a terrible proof of the intensity of the storm. The fall in Calcutta was three-quarters of an inch; at

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Saugor, it appears, by the following statement (for the authenticity of which I can vouch), to have been upwards of *two inches*.

Tuesday, May 21, 1833.		Inches.	Ther.
8 A.M.	The barometer stood at	29.09	80
9	" "	28.67	80½
10	" "	28.00	80
11	No mercury in sight in the tube		80
11.30	Mercury reappeared	26.50	80
Noon.	The barometer stood at	27.00	79½
4 P.M.	" "	27.50	79
8	" "	28.00	
Midnight.	" "	28.60	80½
Wednesday 22.			
4 A.M.	" "	28.20	81
8	" "	28.30	82
Noon.	" "	28.60	84

"The times of the changes are copied from those set down almost immediately after the gale; of course from recollection.

"The oil in the sympiesometer retired completely, when the mercury in the barometer disappeared, and rose again a little before it.

"The mercury in the barometer did not, after Tuesday night, or rather Wednesday morning, act as it should have done, which was found to be owing to some salt water having got down upon the leather bag, and loosened it from the wood, and so having permitted the escape of the mercury.

(Signed) "W. T. D."

"The severity of this hurricane fell on Hidgelee and Saugor. It was not felt at Balasore."—*Journal of Bengal Asiatic Society.*

Malabar coast.

The hurricanes on the Malabar coast appear to be of the same character as those in the Bay of Bengal: but it is impossible to arrive at just conclusions from the imperfect accounts usually given of them.* When the attention of the Officers of the East India Navy is drawn to the subject, they will no doubt explain the mode of action of the winds in these storms, and trace the tracks of hurricanes in the Indian seas.

* Great attention has been paid to this subject in India since this was first published.

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CHAPTER VIII.

THE HURRICANES OF 1780.

After having so far studied the nature of storms, I felt desirous of ascertaining whether the greatest hurricane recorded in West Indian history partook of the same character as those already described; and the Board of Admiralty have afforded me every facility in obtaining the documents necessary for the inquiry.

Three great storms occurred nearly at the same time; and these have been confounded together, and considered but as one. The first destroyed the town of Savanna-la-Mar, on the 3rd of October, 1780. The second, and by far the greater one, passed over Barbados on the 10th and 11th of the same month and year. The third dispersed and disabled the Spanish fleet, under Solano, in the Gulf of Mexico, after it had sailed from Havannah, to attack Pensacola.

An account, published in the "Annual Register," of an earthquake having occurred at the same time, has been quoted as an example to prove that these two phenomena are connected. An earthquake may certainly occur at the same time as a hurricane; but, in the West Indies, persons seem to have been predisposed to believe in these phenomena accompanying

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each other. We have a very strong instance of this in Sir George Rodney's despatch; for, after expressing his conviction that an earthquake must have accompanied the great Barbados hurricane, he states "that the violence of the wind could alone have prevented the inhabitants from feeling the shock," which only proves the force of the wind. The mode of investigation adopted here, of printing in detail the whole of the matter collected relative to hurricanes, will afford to every one the same opportunity for forming a judgment on the truth, or otherwise, of the connection between these phenomena. A note on this subject, introduced into the modern editions of Bryan Edwards's History of the West Indies, is not to be found in the last edition, which that author revised before his death. There seems no reason to doubt, from what we now know of the effects caused by hurricanes, that Savanna-la-Mar was overwhelmed by the sea, owing to the effect of diminished atmospheric pressure, together with the force of the wind.

Chart IX. has been formed from the various documents procured relative to these storms. As England was then at war, there were large fleets in the West Indies and on the American coast; and this circumstance has afforded great facilities for tracing these gales.

On the same principle as that followed in the preceding chapters, documents explanatory of these three hurricanes will now be given in detail; the course of the first one being marked by a line dotted on the Chart.

The command of the British fleet in the West

Indies was divided. Sir Peter Parker commanded at Jamaica, and was at Port Royal; but Sir George Rodney was off New York in the Sandwich, having gone to the coast of America with a portion of his fleet just before the storms occurred.

Of Sir Peter Parker's squadron, the Thunderer, Stirling Castle, Scarborough, Barbados, Phœnix, Deal Castle, Victor, and the Endeavour, were all lost; and nearly the whole of their crews perished. The Berwick, Hector, Trident, Ruby, Bristol, Ulysses, and Pomona, were dismasted.

Of Sir George Rodney's squadron, the Blanche, Andromeda, Laurel, Camelion, and Beaver's Prize, were lost; and the Vengeance, Montagu, Ajax, Alcmene, Egmont, Endymion, Albemarle, Venus, and Amazon, were dismasted or severely damaged.

Some of the logs printed to explain the Savanna-la-Mar hurricane, serve also to explain the great Barbados hurricane.

It is necessary, in comparing the dates, to bear in mind that the log-books of 1780 were kept in nautical time.

Savanna-la-Mar Hurricane.

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Account of the Jamaica hurricane of the 3rd of October, 1780, from the "Annual Register."

Savanna-la-Mar. Chart IX.

"About one P.M. the gale began from the S.E., and continued increasing with accumulated violence until four in the afternoon, when it veered to the *south*, and became a perfect tempest, which lasted in force until near eight; it then abated. The sea during the last period exhibited a most awful scene; the waves swelled to an amazing height, rushed with an impetuosity not to be described on the land, and in a few minutes determined the fate of all the houses in the Bay.

Earthquake said to have been felt at 10 P.M.

"*About ten* the waters began to abate, and at that time a smart shock of an earthquake was felt. All the small vessels were driven ashore, and dashed to pieces. The ships, Princess Royal, Captain Ruthven; Henry, Richardson; and Austin Hall, Austin, were forced from their anchors, and carried so far into the morass that they will never be got off. The earthquake lifted the Princess Royal from her beam-ends, righted her, and fixed her on a firm bed. This circumstance has been of great use to the surviving inhabitants, for whose accommodation she now serves as a house.

Lucea Bay, Jamaica.

"At Lucea Bay only two houses remain; and H. M. sloop Badger, lying in that harbour, has lost all her masts, and run on shore.

Montego Bay, Jamaica.

"At Montego Bay the tempest increased to such an amazing degree, as at dark to threaten general ruin and destruction. The prodigious flashes of lightning, which regularly succeeded each other, was an alleviation. From midnight (from the best of our information and recollection) the storm began to abate."

Midnight.

The log of H. M. sloop Badger, then commanded by the late Lord Collingwood, which is mentioned as having been in Lucea Bay, will be given; and Lucea Bay will be found marked on the Chart.

The centre of the hurricane passed over this vessel about six o'clock on the afternoon of the 3rd October.

Four of the ships which were lost, the Phœnix, Scarborough, Barbados, and Victor, were lying in Mondego Bay a few days before the storm. The two last sailed on the 29th; the Phœnix on the 30th of September; and the Scarborough on the 1st of October. This last ship was bound for the Spanish Main. Both the Badger and Phœnix were in company with the Barbados just previous to the hurricane. The place of the Barbados when last seen by the Phœnix, and of the Phœnix when wrecked on the coast of Cuba, are both marked on the Chart. The Scarborough and Victor have never been heard of.

In a published letter by the First Lieutenant of the Phœnix, the hurricane, as felt by that ship, is thus described. When the Phœnix was in company with the Barbados off Port Antonio, the wind began to blow, with a stormy appearance to the eastward, about 11 at night, on the 2nd of October; and the Phœnix then close-reefed her topsails. At 8, on the morning of the 3rd, the wind was *east-north-east*, with occasional heavy squalls; and Sir Hyde Parker, who commanded the Phœnix, remarked that the weather had the same appearance as he had observed in the commencement of a hurricane in the East Indies. He then ordered the topsails to be taken in, and wore the ship in order to keep mid channel between Jamaica and Cuba.

At 2 P.M. the Phœnix lay-to, with a storm mizen-staysail, and her head to the northward. When night set in, the storm increased with great violence. At midnight the wind was *south-east*, and the ship

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drawing upon Cuba, Sir Hyde Parker determined to wear her; but no canvass could withstand the wind at this time, and she was wore by sending two hundred of the crew into the fore-rigging. When about to cut away the masts, the ship took the ground on the coast of Cuba; and it was then 5 o'clock in the morning of the 4th of October. At Lucea Bay, Jamaica, the Badger's log shows that, six or seven hours before this period, it was moderate weather there; and this proves the progress of the storm. An extract from Lieut. Archer's letter to his mother will be found to follow after the log of the Princess Royal.

By the account here given, the hurricane would appear to have come to Savanna-la-Mar from the south-eastward.

Log of the Badger.

Extract from the Log of H. M. S. BADGER, commanded by Cuthbert Collingwood, Esq., at Lucea Bay, Jamaica.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Monday, October 2, 1780.
P.M.			P.M. Showery; received on board two cords of wood from the shore.
A.M. 10			A.M. Weighed, in company with the Manchæc, for Pensacola. At 10, dispatched the above vessel for Pensacola.
Noon.			Noon, came-to, for Lucea harbour, in seven fathoms water, with the best bower.
			Tuesday, October 3, 1780.
P.M. 9	....	N E	P.M. Moderate. At 9, hard rain, and continued raining all night, with squally weather.
A.M. 10			At 10, tripped our anchor; let her drive within the point of the Fort, till it bore N by E, distant three-quarters of a mile; and the easternmost N E by N, distant one mile and a half; heavy squalls, with hard rain; down top-gallant-masts.

Log of the Badger.

Extract from the Log of H. M. S. BADGER—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, October 4, 1780.
P.M. 1	....	N E	P.M. At 1, let go the sheet anchor in five and a half fathoms; muddy; veered the cable, and brought both anchors a-head; continued very heavy gales, with hard rain.
4			At 4, let go another anchor.
4.30			At 4.30, both sheet and bower anchors came home; veered away to the clinch round the mast, when the best bower cable parted; then immediately the sheet cable parted likewise.
5			At 5, she was driving on shore very fast, when a gust of wind laid her down, with the coamings of the hatchway in the water. By consent of captain and officers, cut away the weather lanyards of the main shrouds, when the mainmast went away about twenty feet above deck; she immediately righted, and drove broadside on shore, abreast of the town, the sea making a free passage over us, when our boat went to pieces alongside.
5.30			At 5.30 cut the bower cable to let her swing end on.
6	....	Calm S W	About 6, it fell calm for half an hour, when the wind shifted round to the S W, blowing a hurricane, with strong flashes of lightning.
10			At 10, it became quite moderate.
A.M.			A.M. Turned everybody to, to clear the wreck of the mast; moderate, with frequent showers.
			Tuesday, October 10, 1780. Had an account of H.M.S. Phœnix being wrecked on the coast of Cuba. (Signed) JAMES MORING.

Extract of a despatch from Rear-Admiral Sir Peter Parker, commanding a squadron on the Jamaica station, dated on board the Ruby, Port Royal harbour, Nov. 6, 1780.

"It is with much concern, that I give the following detail of the disasters which have befallen some of the ships and vessels on this station in the late hurricanes.

"The 4th of last month, at half-past five in the morning, H.M.S. Phœnix was wrecked on the island of Cuba, about three leagues to the eastward of Cape Crux, in a most dreadful hurri-

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cane; and, according to Sir Hyde Parker's representation, if she had not been driven on shore she must soon have foundered. All the ship's company were saved excepting twenty, most of whom were lost with the mainmast and washed overboard. Sir Hyde Parker despatched his first lieutenant, Mr. Archer, in one of the ship's boats to Montego Bay for assistance; and, by the 11th of October, all that remained of the ship's crew, to the number of 240, were embarked on board of H. M. sloop Porcupine and three sloops, and arrived safe in Montego Bay on the 15th. I sent the James to bring the people round to this port and this bay. Sir H. Parker was tried for the loss of the ship, and honourably acquitted.

"H. M. sloops the Barbados and Victor, and H. M. S. the Scarborough, were in the hurricane. The two former, it is apprehended, are foundered; but the latter, I am in hopes, is safe. She was under orders to proceed to the Spanish Main; and as *the hurricane ran in veins*, she may have escaped, as well as the Pallas, Diamond, Pelican, and Lowestoffe, who were also at sea at the time, and are all arrived safe, without any damage whatever. The Pomona arrived on the 24th, with the bowsprit and foremast sprung, and mizen-mast gone; and on the 26th, Rear-Admiral Rowley arrived in the Grafton, with the following ships, from convoying the trade part of the way to Europe, viz., the Hector, Bristol, Trident, and Ruby, all of them disabled, and mostly dismasted. The Ulysses arrived the same day, without main and mizen-mast, having thrown all her upper-deck guns overboard. Captain Stewart has informed me that he is going to England with the Berwick, dismasted; and I hope the Thunderer and Stirling Castle are also on their passage home, for I have not as yet received any intelligence of these ships.

"Their Lordships will see, by the enclosed defects of the ships, what a miserable state several of them are in; and what a number of masts, yards, and stores, are wanting to refit them.

"I have dircted the naval storekeeper to send an abstract of the defects, &c., and remainder of stores in our magazine, to the Commissioners of the Navy, and I have written to them on that head.

"Surveys are taking on the hulls of the ships that were in the hurricanes of the 5th and 17th ultimo. It is at present apprehended that the Hector cannot be put into a condition here to enable her to proceed to England before next summer; but she

may then safely undertake the voyage with jury-masts, and only a few guns on board. She threw all her guns overboard in the storm, excepting two 18-pounders.

"I shall send home with the next convoy as many of the disabled ships as can be fitted with jury-masts. By the different accounts which have arrived, I find that the late storms have visited the Windward Islands as well as these seas. The Egmont arrived here on the 28th ultimo. On the 11th of last month the Egmont, Montagu, Ajax, and Amazon, being placed across the entrance of the careenage to St. Lucia, were obliged, by the violence of the wind, to put to sea; and Captain Fanshawe does not know what has become of the other ships. On the 29th, the Endymion arrived at this port from a cruize to windward of Martinico, with only the foremast standing. She brought in with her two French ships, named the Marquis de Brancas and L'Esle, which she took on her way hither. These two ships were, on the 11th of October, forced out with many others from St. Pierre's Road, Martinico, by the violence of the storm. They only arrived the day before with about fifty merchant ships, transports, and victuallers, and having 5000 troops on board; and were escorted by two French frigates, named La Ceres and La Constant.

French convoy.

"I am, Sir, &c.

(Signed) "P. PARKER."

"To PHILIP STEPHENS, Esq."

Extract of a letter from Rear-Admiral Sir Peter Parker, Commander on the Jamaica station, dated on board the Ruby, 30th December, 1780.

"By my last letter of the 6th ultimo, their Lordships will see the distressed state of this squadron. The loss of the Scarborough frigate, and the Barbados and Victor sloops, seems now past all doubt. The Thunderer has not been heard of. There is a chance that she has either got to England or America.

"The 19th of October, the Stirling Castle, after having weathered the late gale and saved her foremast, her hull being very little damaged, ran at nine o'clock at night, going eight knots,

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on the Silver Keys, which are a cluster of rocks, several of them under water, about fifteen leagues north of Old Cape François. She immediately separated; and, of the whole crew, we only hear of one midshipman and four seamen who have escaped. Two of the seamen are now at the Cape; the midshipman and the other seamen were taken from a part of the wreck by a small vessel, and carried into Port-au-Prince, where they were clothed and treated with great humanity, and sent down here in a flag of truce,"

The next log is that of the Princess Royal, a 90-gun ship, lying in Port Royal Harbour. No allusion is made to an earthquake either in this log or in any of the official documents which I have met with from Jamaica.

Log of the Princess Royal.

Extract from a Journal of the Proceedings of H.M.S. PRINCESS ROYAL, Captain Harwood.—In *Nautical Time.*

(Ship alongside the Wharf at Port Royal Harbour.)

Hour.	Courses.	Winds.	Remarks.
			Monday, October 2, 1780.
P.M.	....	ESE	P.M. Squally weather, with heavy showers of rain; hauled the ship off from the wharf to make room for the stages.
A.M.	....	SE ESE	A.M. People employed in sundry duties; carpenters fitting the outrigger; caulkers caulking the first course on the larboard-side of the ship's bottom.
			Tuesday, October 3, 1780.
P.M.	....	SE by E	P.M. Squally weather, with rain; people employed as before; violent squalls, with very heavy rain in the night; wind from the south-eastward.
A.M.	....	ESE SE	A.M. The gale increasing, with much rain; people employed securing the ship; by the violence of the wind in the night, the mizen-topsail, fore-top-gallant-sail, and main-top-gallant-sail, that were covering tents in the yard, and had been condemned by survey on the 30th September last, were entirely blown to pieces.

Extract from a Journal of the Proceedings of H. M. S. PRINCESS ROYAL—*concluded.*

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Log of the Princess Royal.

Hour.	Courses.	Winds.	Remarks.
			Wednesday, October 4, 1780.
P.M.	....	SSE	P.M. Excessive hard squalls, with thunder, lightning, and rain; people employed as before. At midnight more moderate, and light rain.
A.M.	....	S	A.M. Moderate and fair; people employed getting the outrigger's pendants over the masthead, and other duties; caulkers caulking the larboard-side of the ship's bottom.
		SSW	

Extract from a letter* of Lieutenant Archer's to his mother. The Phœnix frigate had been sent to Pensacola. This extract commences from that part of the letter which speaks of the ship's return to Jamaica.

Chart IX.

Lieut. Archer's letter.

"Nothing remarkable happened for ten days afterwards, when we chased a Yankee man-of-war for six hours, but could not get near enough to her before it was dark, to keep sight of her; so that we lost her because unable to carry any sail on the mainmast. In about twelve days more made the island of Jamaica, having weathered all the squalls, and put into Montego Bay for water; so that we had a strong party for kicking up a dust on shore, having found three men-of-war lying there. Dancing, &c. &c. till two o'clock every morning, little thinking what was to happen in four days' time; for out of the four men-of war that were there, not one was in being at the end of that time, and not a soul alive but those left of our crew. Many of the houses, where we had been so merry, were so completely destroyed, that scarcely a vestige remained to mark where they stood. Thy works are wonderful, O God! praised be thy holy name!

"September the 30th, weighed; bound for Port Royal, round the eastward of the island; the Barbados and Victor had sailed the day before, and the Scarborough was to sail the next. Mo-

* I am indebted to Mr. Redfield for this letter.

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derate weather until October the 2nd. Spoke to the Barbados off Port Antonio in the evening. At eleven at night it began to snuffle, with a monstrous heavy appearance from the eastward. Close reefed the topsails. Sir Hyde sent for me. 'What sort of weather have we, Archer?' 'It blows a little, and has a very ugly look: if in any other quarter but this, I should say we were going to have a gale of wind.'—'Ay, it looks so very often here when there is no wind at all; however, don't hoist the topsails till it clears a little; there is no trusting any country.' At twelve I was relieved; the weather had the same rough look: however, they made sail upon her, but had a very dirty night. At eight in the morning I came up again, found it blowing hard from the *east-north-east* with close-reefed topsails upon the ship, and heavy squalls at times. Sir Hyde came upon deck. 'Well, Archer, what do you think of it?' 'Oh, Sir, it is only a touch of the times; we shall have an observation at twelve o'clock; the clouds are beginning to break; it will clear up at noon, or else blow very hard afterwards.'—'I wish it would clear up; but I doubt it much. I was once in a hurricane in the East Indies, and the beginning of it had much the same appearance as this: so take in the topsails; we have plenty of sea-room.'

"At twelve, the gale still increasing, wore ship, to keep as near mid-channel, between Jamaica and Cuba, as possible: at one the gale increasing still; at two harder yet: it still blows harder. Reefed the courses, and furled them; brought-to under a foul mizen-staysail: head to the northward. In the evening no sign of the weather taking off, but every appearance of the storm increasing, prepared for a proper gale of wind; secured all the sails with spare gaskets; good rolling tackles upon the yards; squared the booms; saw the boats all made fast; new lashed the guns; double-breeched the lower deckers; saw that the carpenters had the tarpaulins and battens all ready for hatchways; got the top-gallant-mast down upon the deck; jib-boom and spritsail-yard fore and aft; in fact, every thing we could think of to make a snug ship.

"The poor devils of birds now began to find the uproar in the elements, for numbers, both of sea and land kinds, came on board of us. I took notice of some which, happening to be to leeward, turned to windward, like a ship, tack and tack; for they could not fly against it. When they came over the ship they dashed themselves down upon the deck, without attempt-

ing to stir till picked up, and when let go again they would not leave the ship, but endeavoured to hide themselves from the wind.

"At eight o'clock a hurricane; the sea roaring, but the wind still steady to a point; did not ship a spoonful of water. However, got the hatchways all secured, expecting what would be the consequence, should the wind shift; placed the carpenters by the mainmast, with broad axes, knowing, from experience, that at the moment you may want to cut it away to save the ship an axe may not be found. Went to supper—bread, cheese, and porter. The purser frightened out of his wits about his bread-bags; the two marine-officers as white as sheets, not understanding the ship's working so much, and the noise of the lower deck guns, which, by this time, made a pretty screeching to people not used to it; it seemed as if the whole ship's side was going at each roll. *Wooden*, our carpenter, was all this time smoking his pipe and laughing at the doctor; the second lieutenant upon deck, and the third in his hammock.

"At ten o'clock I thought to get a little sleep; came to look into my cot, it was full of water; for every seam, by the straining of the ship, had begun to leak. Stretched myself, therefore, upon deck between two chests, and left orders to be called, should the least thing happen. At twelve a midshipman came to me. 'Mr. Archer, we are just going to wear ship, Sir.' 'Oh, very well; I'll be up directly. What sort of weather have you got?'—'It blows a hurricane.' Went upon deck; found Sir Hyde there. 'It blows damned hard, Archer.' 'It does indeed, Sir.'—'I don't know that I ever remember its blowing so hard before, but the ship makes a very good weather of it upon this tack as she bows the sea; but we must wear her, as the wind has shifted to the *south-east*, and we are drawing right upon Cuba; so do you go forward, and have some hands stand by; loose the lee yard-arm of the foresail, and, when she is right before the wind, whip the clew-garnet close up, and roll up the sail.' 'Sir, there is no canvass can stand against this a moment; if we attempt to loose him he will fly into ribbons in an instant, and we may lose three or four of our people; she'll wear by manning the fore shrouds.'—'No, I don't think she will.' 'I'll answer for it, Sir; I have seen it tried several times on the coast of America with success.'—'Well, try it; if she does not wear, we can only loose the foresail afterwards.' This was a great condescension from such a man as Sir Hyde. How-

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ever, by sending about two hundred people into the fore-rigging, after a hard struggle, she wore; found she did not make so good weather on this tack as on the other; for as the sea began to run across she had not time to rise from one sea before another lashed against her. Began to think we should lose our masts, as the ship lay very much along, by the pressure of the wind constantly upon the yards and masts alone; for the poor mizen-staysail had gone in shreds long before, and the sails began to fly from the yards through the gaskets into coachwhips. My God! to think that the wind could have such force!

"Sir Hyde now sent me to see what was the matter between decks, as there was a good deal of noise. As soon as I was below, one of the marine-officers calls out, 'Good God! Mr. Archer, we are sinking; the water is up to the bottom of my cot.'—'Pooh, pooh! as long as it is not over your mouth you are well off; what the devil do you make this noise for?' I found there was some water between decks, but nothing to be alarmed at: scuttled the deck, and let it run into the well; found she made a good deal of water through the sides and decks; turned the watch below to the pumps, though only two feet of water in the well; but expected to be kept constantly at work now, as the ship laboured much, with scarcely a part of her above water but the quarter-deck, and that but seldom. 'Come, pump away, my boys. Carpenters, get the weather chain-pump rigged.' 'All ready, Sir.'—'Then man it, and keep both pumps going.'

"At two o'clock the chain-pump was choked; set the carpenters at work to clear it; the two head-pumps at work upon deck: the ship gained upon us while our chain-pumps were idle: in a quarter of an hour they were at work again, and we began to gain upon her. While I was standing at the pumps, cheering the people, the carpenter's mate came running to me with a face as long as my arm. 'Oh, Sir, the ship has sprung a leak in the gunner's room.'—'Go, then, and tell the carpenter to come to me; but don't speak a word to any one else.... Mr. Goodinoh, I am told there is a leak in the gunner's room; go and see what is the matter, but don't alarm any body; and come and make your report privately to me.' In a short time he returned. 'Sir, there's nothing there; 'tis only the water washing up between the timbers that this booby has taken for a leak.' 'Oh, very well; go upon deck and see if you can keep

any of the water from washing down below.'—'Sir, I have had four people constantly keeping the hatchways secure, but there is such a weight of water upon the deck that nobody can stand it when the ship rolls.' The gunner soon afterwards came to me. 'Mr. Archer, I should be glad if you would step this way into the magazine for a moment.' I thought some damned thing was the matter, and ran directly 'Well, what is the matter here?'—'The ground tier of powder is spoiled, and I want to show you that it is not out of carelessness in me in stowing it, for no powder in the world could be better stowed: now, Sir, what am I to do? if you don't speak to Sir Hyde, he will be angry with me.' I could not forbear smiling to see how easy he took the danger of the ship, and said to him, 'Let us shake off this gale of wind first, and talk of the damaged powder afterwards.'

"At four we had gained upon the ship a little, and I went upon deck, it being my watch. The second lieutenant relieved me at the pumps. Who can attempt to describe the appearance of things upon deck? If I was to write for ever I could not give you an idea of it—a total darkness all above; the sea on fire, running as it were in Alps, or Peaks of Teneriffe (mountains are too common an idea); the wind roaring louder than thunder (absolutely no flight of imagination); the whole made more terrible, if possible, by a very uncommon kind of blue lightning; the poor ship very much pressed, yet doing what she could, shaking her sides, and groaning at every stroke. Sir Hyde upon deck lashed to windward! I soon lashed myself alongside of him, and told him the situation of things below, saying the ship did not make more water than might be expected in such weather, and that I was only afraid of a gun breaking loose. 'I am not in the least afraid of that; I have commanded her six years, and have had many a gale of wind in her; so that her iron work, which always gives way first, is pretty well tried. Hold fast! that was an ugly sea; we must lower the yards, I believe, Archer; the ship is much pressed.'—'If we attempt it, Sir, we shall lose them, for a man aloft can do nothing; besides, their being down would ease the ship very little; the mainmast is a sprung mast; I wish it was overboard without carrying anything else along with it; but that can soon be done; the gale cannot last for ever; 'twill soon be daylight now.' Found by the master's watch that it was five o'clock, though but a little after four by ours; glad

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it was so near daylight, and looked for it with much anxiety. Cuba, thou art much in our way! Another ugly sea: sent a midshipman to bring news from the pumps: the ship was gaining on them very much, for they had broken one of their chains, but it was almost mended again. News from the pump again. 'She still gains! a heavy lee!' Back-water from leeward, half-way up the quarter-deck, filled one of the cutters upon the booms, and tore her all to pieces; the ship lying almost on her beam-ends, and not attempting to right again. Word from below that the ship still gained on them, as they could not stand to the pumps, she lay so much along. I said to Sir Hyde, 'This is no time, Sir, to think of saving the masts; shall we cut the mainmast away?'—'Ay! as fast as you can.' I accordingly went into the chains with a pole-axe, to cut away the lanyards; the boatswain went to leeward, and the carpenters stood by the mast. We were all ready, when a very violent sea broke right on board of us, carried every thing upon deck away, filled the ship with water, the main and mizen masts went, the ship righted, but was in the last struggle of sinking under us.

"As soon as we could shake our heads above water, Sir Hyde exclaimed, 'We are gone at last, Archer! foundered at sea!'—'Yes, Sir; farewell; and the Lord have mercy upon us!' I then turned about to look forward at the ship, and thought she was struggling to get rid of some of the water; but all in vain: she was almost full below. 'Almighty God! I thank thee, that now I am leaving this world, which I have always considered as only a passage to a better, I die with a full hope of thy mercies, through the merits of Jesus Christ, thy son, our Saviour!'

"I then felt sorry that I could swim, as by that means I might be a quarter of an hour longer dying than a man who could not; and it is impossible to divest ourselves of a wish to preserve life. At the end of these reflections I thought I heard the ship thump and grinding under our feet: it was so. 'Sir, the ship is ashore!' 'What do you say?'—'The ship is ashore, and we may save ourselves yet!' By this time the quarter-deck was full of men, who had come up from below, and 'The Lord have mercy upon us!' flying about from all quarters. The ship now made every body sensible that she was ashore, for every stroke threatened a total dissolution of her whole frame: found she was stern ashore; and the bow broke

the sea a good deal, though it was washing clean over at every stroke. Sir Hyde cried out, 'Keep to the quarter-deck, my lads; when she goes to pieces it is your best chance!' Providentially got the foremast cut away, that she might not pay round broadside. Lost five men cutting away the foremast, by the breaking of a sea on board just as the mast went. That was nothing, every one expected it would be his own fate next: looked for daybreak with the greatest impatience; at last it came: but what a scene did it show us! The ship upon a bed of rocks, mountains of them on one side, and Cordilleras of water on the other; our poor ship grinding and crying out at every stroke between them; going away by piecemeal. However, to show the unaccountable workings of Providence, that which often appears to be the greatest evil proves to be the greatest good! That unmerciful sea lifted and beat us up so high among the rocks that at last the ship scarcely moved. She was very strong, and did not go to pieces at the first thumping, though her decks tumbled in. We found afterwards that she had beat over a ledge of rocks, almost a quarter of a mile in extent beyond us, where, if she had struck, every soul of us must have perished.

"I now began to think of getting on shore, so stripped off my coat and shoes for a swim, and looked for a line to carry the end with me. Luckily could not find one, which gave me time for recollection. 'This won't do for me, to be the first man out of the ship, and first lieutenant; we may get to England again; and people may think I paid a great deal of attention to myself, and did not care for any body else. No, that won't do; instead of being the first, I will see every man, sick and well, out of her before me.'

"I now thought there was no probability of the ship's soon going to pieces, therefore had not a thought of instant death: took a look round with a kind of philosophic eye, to see how the same situation affected my companions, and was surprised to find the most swaggering, swearing bullies, in fine weather, now the most pitiful wretches on earth, when death appeared before them. However, two got safe; by which means, with a line, we got a hawser on shore, and made fast to the rocks, upon which many ventured and arrived safe. There were some sick and wounded on board, who could not avail themselves of this method; we, therefore, got a spare top-sail-yard from the chains,

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and placed one end ashore and the other on the cabin window, so that most of the sick got ashore this way.

"As I had determined, so I was the last man out of the ship; this was about ten o'clock. The gale now began to break. Sir Hyde came to me, and taking me by the hand, was so affected, that he was scarcely able to speak. 'Archer, I am happy beyond expression to see you on shore, but look at our poor Phœnix!' I turned about, but could not say a single word, being too full: my mind had been too intensely occupied before; but every thing now rushed upon me at once, so that I could not contain myself, and I indulged for a full quarter of an hour in tears.

"By twelve it was pretty moderate; got some nails on shore and made tents; found great quantities of fish driven up by the sea into holes of the rocks; knocked up a fire, and had a most comfortable dinner. In the afternoon made a stage from the cabin windows to the rocks, and got out some provisions and water, lest the ship should go to pieces, in which case we must all have perished of hunger and thirst; for we were upon a desolate part of the coast, and under a rocky mountain, that could not supply us with a single drop of water.

"Slept comfortably this night and the next day, the idea of death vanishing by degrees; the prospect of being prisoners, during the war, at Havanna, and walking three hundred miles to it through the woods, was rather unpleasant. However, to save life for the present, we employed this day in getting more provisions and water on shore, which was not an easy matter, on account of decks, guns, and rubbish, and ten feet water that lay over them. In the evening, I proposed to Sir Hyde to repair the remains of the only boat left, and to venture in her to Jamaica myself; and in case I arrived safe, to bring vessels to take them all off; a proposal worthy of consideration. It was, next day, agreed to; therefore got the cutter on shore, and set the carpenters to work on her; in two days she was ready, and at four o'clock in the afternoon I embarked with four volunteers and a fortnight's provision; hoisted English colours as we put off from the shore, and received three cheers from the lads left behind, which we returned, and set sail with a light heart, having not the least doubt, that, with God's assistance, we should come and bring them all off. Had a very squally night, and a very leaky boat, so as to keep two buckets constantly baleing. Steered her myself the whole night by the stars, and in

the morning saw the coast of Jamaica, distant twelve leagues. At eight in the evening arrived at Montego Bay.

"I must now begin to leave off, particularly as I have but half an hour to conclude; else my pretty little short letter will lose its passage, which I should not like, after being ten days, at different times, writing it, beating up with the convoy to the northward, which is a reason that this epistle will never read well; for I never sat down with a proper disposition to go on with it; but as I knew something of the kind would please you, I was resolved to finish it: yet it will not bear an overhaul; so don't expose your son's nonsense.

"But to proceed. I instantly sent off an express to the admiral, another to the Porcupine man-of-war, and went myself to Martha Bay to get vessels; for all their vessels here, as well as many of their houses, were gone to *moco*. Got three small vessels, and set out back again to Cuba, where I arrived the fourth day after leaving my companions. I thought the ship's crew would have devoured me on my landing; they presently whisked me up on their shoulders, and carried me to the tent where Sir Hyde was.

"I must omit many little occurrences that happened on shore, for want of time; but I shall have a number of stories to tell when I get alongside of you; and the next time I visit you I shall not be in such a hurry to quit you as I was the last, for then I hoped my nest would have been pretty well feathered. But my tale is forgotten.

I found the Porcupine had arrived that day, and the lads had built a boat almost ready for launching, that would hold fifty of them, which was intended for another trial, in case I had foundered. Next day embarked all our people that were left, amounting to two hundred and fifty; for some had died of their wounds they received in getting on shore; others of drinking rum; and others had straggled into the country. All our vessels were so full of people, that we could not take away the few clothes that were saved from the wreck; but that was a trifle since we had preserved our lives and liberty. To make short of my story, we all arrived safe at Montego Bay, and shortly after at Port Royal, in the Janus, which was sent on purpose for us, and were all honourably acquitted for the loss of the ship. I was made admiral's aide-de-camp; and a little time afterwards sent down to St. Juan's as captain of the Resource, to bring what were left of the poor devils to Blue Fields

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on the Musquito shore, and then to Jamaica, where they arrived after three months' absence, and without a prize, though I looked out hard off Porto Bello and Carthagena. Found in my absence that I had been appointed captain of the Tobago, where I remain his Majesty's most true and faithful servant, and my dear mother's most dutiful son.

"——— ARCHER."

The logs of the four ships, which Sir Peter Parker in his despatch reports as having returned safe, follow next.

It will be seen, that the Pelican and Diamond, which were to the south of Jamaica, felt nothing of the first storm; and that the Pallas and Lowestoffe were out of the influence of it, cruizing near the islands of Caycos; yet they had the wind from *south-south-west*, and must have been just on the border of the gale.

The Scarborough, on her way from Montego Bay to the Spanish Main, would be within its influence off the west end of Jamaica, and near that point she probably foundered.

This hurricane may have originated within the limits of the Caribbean Sea; since we have no account of its passing over the chain of the Antilles islands, or of having visited the Spanish Main.

Log of the Pelican.

Extract from the Log of H.M.S. PELICAN, Captain Thomas Haynes.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			October 3, 1780.
1	W N W	Westerly	P.M. Light breezes and cloudy.
4	N W by N		Lat. 12° 38′, long. 82° 7′.
5	N by E		Great Corn Island, S 68° W, distance 35 miles.
6	N ½ W		
A.M.			
7	N W		

Log of the Pelican.

Extract from the Log of H. M. S. PELICAN—*continued.*

Hour.	Courses.	Winds.	Remarks.
			October 4, 1780.
P.M.			
1	N W by W	Westerly	Moderate breeze and clear weather.
2	S S E		Lat. 12° 25′ N.
7	W		Great Corn Island, S W by W, distance
9	W by N		8 leagues.
10	N W		
A.M.			
9	S		
			October 5, 1780.
P.M.			
1	W N W	Ditto	P.M. Fresh breezes.
6	N W by W		Great Corn Island, W S W, 2½ leagues.
7	S by E		
9	S S E		
10	S		
A.M.			
4	N W ½ W		
10	S		
12	N W		
			October 6, 1780.
		Ditto	Fresh breeze and cloudy; at anchor at Great Corn Island.
			October 7, 1780.
P.M.			
2	W N W	S Westly	Moderate breeze and clear weather; got under weigh.
5	N W ½ W		
7	S by W		
8	S S W		
9	S by W		
11	S		
Noon			Noon. Lat. 12° 5′ N.
			October 8, 1780.
A.M.			
3	S ½ E	Westerly	Light breezes and clear.
5	N W		Lat. 12° 2′.
7	N W by N		
8	N W		
10	N N W		
		Variable	October 9, 1780.
			October 10, 1780.
		Variable	First and latter part, light breezes and clear; middle part, squally.
			October 11, 1780.
		Westerly	Light breezes.

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Log of the Pelican.

Extract from the Log of H. M. S. PELICAN—*continued.*

Hour.	Courses.	Winds.	Remarks.
			October 12, 1780.
Noon.	.....	W S W	Got under weigh and made sail. Noon. Moderate. Great Corn Island, N E ½ E, distance 7 leagues. Lat. 12° 9′.
			October 13, 1780.
P.M. 3	E	SE by S	Fresh breezes and clear; set studding-sails.
9	E ½ S		Lat. 11° 47′, long. 80° 40′.
12	E		The Island of St. Andria, bearing N 9° W, distance 44 miles.
A.M. 11	E by N		
			October 14, 1780.
P.M. 1	E N E	S S W	P.M. Light breezes and clear weather.
Noon.	.....	S W	Noon. Moderate breeze and cloudy. Lat. 12° 8′, long. 79° 31′. Bugles' Shoals, bearing N 21° E, distance 76 leagues.
			October 15, 1780.
P.M. 1	E N E	W S W	P.M. Moderate breeze and clear weather.
6			Hauled down the studding-sails.
A.M. 3	.....	S W	A.M. Hard squall and rain; handed the top-gallant-sails and staysails.
4	.....	W	Fresh gales and rainy weather.
6	.....	W S W	More moderate and fair.
10			Fresh gale and hazy; close-reefed top-sails, and handed the fore and mizen ditto; down top-gallant-yards.
Noon.			Lat. 12° 52′ N, long. 76° 58′ W. Bugles' Shoals, N 24° W, distance 187 miles.
			October 16, 1780.
P.M. 1	N E by N		P.M. Fresh gale and cloudy.
7	N by E	W	In third reef main-topsail, and handed the mizen-topsail.
A.M. 10			Hard squalls; lowered topsails occasionally.
Noon.			Noon. Ditto weather.
A.M. 7	N ½ E		No observation.
8	N		Lat. 15° 35′, long. 75° 55′.
			October 17, 1780.
P.M. 1	N	S W	P.M. Fresh gales, with squall.
3	.....	W S W	Hauled up the courses and bent the main-sail, it being split, and bent another.
4			
7	.....	S W	Set the mainsail and lay-to; hard squalls, with rain.
12	.....	W S W	More moderate and rainy weather;

Within the influence of the great hurricane.

Log of the Pelican.

Extract from the Log of H.M.S. PELICAN—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			October 17, 1780.
A.M.			hauled up the mainsail, and set the fore-topmast-staysail.
1	N by W		Squally.
4			Ditto.
7	N ½ W		A great swell from the westward.
9	N N W	Variable	Out three reefs.
10			Lat. 17°, long. 76°.
			October 18, 1780.
P.M.			P.M. Fresh breezes and squally.
1	.....	W S W	Lat. 17° 47′.
			Point Morant, bearing N N E, distance 8 or 9 miles.

Log of the Diamond.

Extract from the Log of H. M. S. DIAMOND, Captain John Linzee.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			October 3, 1780.
			P.M. Light winds and clear all night.
		Westerly	A.M. Moderate breezes and clear weather; at 6, weighed and made sail with three sail under our convoy for Blue Fields; at 9, hove-to for the convoy; at half-past 10, made sail; at noon, St. Juan Point, S E ½ S, distance 7 or 8 leagues. Point Gordon, W by N. distance 3 leagues.
			October 4, 1780.
P.M.			
1	.....	W N W	P.M. Light winds and clear weather.
5			Up mainsail.
7			Monkey Point, N ½ W, distance 2 or 3 leagues.
A.M.			
1			A.M. Moderate and hazy.
6	.....	W by S	Little Corn Island, E ½ N, distance 5 or 6 leagues. Blue Fields, S W, distance 6 or 7 leagues.
8	.....	W	
10			Set mainsail, out second-reef topsails, set top-gallant sails.
			October 5, 1780.
P.M.			
1	.....	S W by W	P.M. Fresh breezes and clear weather.
5			Blue Fields' Bluff, S W ½ W, distance 3 or 4 leagues.
8	.....	W S W	Made the convoy's signal to tack.
A.M.			
1	.....	W by S	Bluff, S by W ½ W, distance 3 or 4 miles.
6			

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Log of the Diamond.

Extract from the Log of H. M. S. DIAMOND—*continued.*

Hour.	Courses.	Winds.	Remarks.
			October 6, 1780.
P.M. 1	S 52° E	Calm	P.M. Fresh breezes. Lat. 10° 40′, long. 81° 5′. Corn Island, bearing N 52° W, distance 98 miles.
			October 7, 1780.
P.M. 1	S 81° E	S E	P.M. Light winds and hazy. Lat. 10° 32′, long. 80° 3′. Porto Bello, S E, 14 leagues.
			October 8, 1780.
P.M. 1	..... E	Westerly	P.M. Light airs and cloudy. Lat. 10° 32′, long. 79° 12′ W.
			October 9, 1780.
P.M. 1	..... E by N	Easterly	P M. Light breezes. Lat. 10° 52′, long. 78° 5′.
			October 10, 1780.
P M. 1	..... E	Variable	P.M. Light air and clear weather. Lat. 10° 54′, long. 76° 33′ W.
			October 11, 1780.
P.M. 1	.....	S E	P.M. Squally, with rain.
A.M. 2			A.M. Light winds and squalls, with rain. No observation. High land of Santa Marta, bearing S E, distance 11 leagues.
			October 12, 1780.
P.M. 1	.....	S W	P.M. Moderate and cloudy.
Midn.	.....	S S W	Moderate and squally.
A.M. 11	..... N N E ½ E	W N W	Moderate breezes and rain. Lat. 12°, long. 73°.
			October 13, 1780.
P.M. 1	.....	S W by W	P.M. Fresh breezes and squally.
6			
8	.....	N W	Light airs and fair weather.
A.M. 4	.....	N W b W	Moderate and squally.
Noon	N E	N W	Noon. Moderate and fair. Lat. 13° 57′, long. 72° 26′

Log of the Diamond.

The great hurricane approaching.

Extract from the Log of H. M. S. DIAMOND—*continued.*

Hour.	Courses.	Winds.	Remarks.
			October, 14, 1780.
P.M.			
1	.....	W N W	P.M. Moderate and squally.
4	.....	N W	Squally, with rain; up mainsail.
A.M.			
4	.....	Ditto	A.M. Fresh breezes and squally; in two reefs in the topsail.
			Fresh gales and cloudy.
Noon	N N E	W by N ½ N	Noon. Moderate and clear. Lat. 15° 59′, long. 71° 38′.
			October 15, 1780.
P.M.			
1	.....	W by N	P.M. Close-reefed the topsails.
4	.....	N W b W	Moderate breezes and squalls.
Midn.	.....	N W	Midnight. Heavy squalls; in fore and mizen-topsail.
A.M.			
7	.....	N W	A.M. Carried away one of the fore sheets; clewed up the foresail and reefed it again, set the sail.
9	.....	N W b W	In main-topsail.
10			Hove-to.
Noon			Noon. Strong gales and squally. High land about Cape Beata, St. Domingo, bearing N N W, distance 13 leagues.
			October 16, 1780.
P.M.			
1	.....	W	P.M. Strong gales.
4			Reefed the mainsail and handed ditto; set balanced mizen; the land bore from S by W to W by N, distance 12 or 14 leagues.
12			Ditto weather.
A.M.			
5			A.M. Cloudy, with showers of rain.
7	.....	S W by W	Let the reef out the mainsail, and made sail.
8	.....	S W	Carried away the main-topmast-stay and spring, fore-topmast ditto.
10	.....	S W	Moderate and clear; spliced the stays and set up ditto.
			Ditto weather.
12			Lat. 17° 22′.
			October 17, 1780.
P.M.			
1	.....	S W	P.M. Fresh breeze and squally weather.
4			Spanned the main and mizen shrouds.
8	.....	S W by S	Wore ship.
12	.....	S W	Handed the fore-topsail.
A.M.			
1			A.M. In main-topsail; hove-to.
6			Strong gales and squally weather.
11			More moderate; wore ship; up foresail; set up the main rigging. Lat. 17° 35′ N.

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Log of the Diamond.

Extract from the Log of H. M. S. DIAMOND—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			October 18, 1780.
1			P.M. Saw the land, bearing E by N, distance 9 or 10 leagues.
3			Unbent the foresail and bent a new one.
5			Wore ship; unbent fore-topmast-staysail, and bent another.
6			The Island of Beata, bore E N E, distance 9 or 10 leagues.
8	.....	N W	Light airs.
12			Rainy weather.
A.M.			
6	.....	Ditto	A.M. The Island of Beata, N N E, distance 5 or 6 leagues.
8	.....	N	Moderate and clear; out second reefs topsail.
10	.....	Calm	
12	.....	N by E	Island of Beata, N E by N, distance 9 leagues. Lat. 17° 20′ N.
P.M.			October 19, 1780.
1	.....	N by E	P.M. Light airs and hazy weather.
2	.....	S by W	
6	.....	W S W	In second reefs topsails.
7	.....	W	Island of Beata, N E, distance 6 leagues; wore ship.
8	.....	W S W	
9	.....	W by N	
11	.....	W N W	
12			Ditto weather.
A.M.			
5, 6, 7	.....	Calm	
8	.....	S E	A.M. Light breezes and squally with rain.
10			Out first reef main-topsail.
11			Saw two sail from the mast-head bearing N W by N.
12	.....	S E by E	Light breezes and hazy weather.
	S W		Lat. 17° 11′ N.
P.M.			October 20, 1780.
1	.....	E by S	P.M. Light breezes and drizzling rain.
6	.....	W S W	Squally, with rain.
Noon			Noon. Ditto, ditto.
	S 76° W		Lat. 16° 44′, long. 73° 20′.
P.M.			October 21, 1780.
1	.....	N N E	P.M. Squally, with rain.
4	.....	Easterly and variable	Moderate and clear.
	N W ½ W		Lat. 17° 34′, long. 74° 41′.

Log of the Diamond.

Extract from the Log of H. M. S. DIAMOND—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M. 1	.....	Easterly and variable	October 22, 1780. P.M. Light breezes and cloudy. Saw Jamaica, and anchored at Port Royal Harbour on the 23rd October.

The Pallas and the Lowestoffe must have been just on the east side of this first hurricane; and it is remarkable, that these ships were becalmed at no great distance from both storms. They narrowly escaped the second one by leaving their cruising ground; and it is interesting to follow their tracks on the Chart, and trace their escape.

Log of the Pallas.

Extract from the Log of H. M. S. PALLAS, Captain T. Spry.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			October 3, 1780.
1	W N W	S W	P.M. Moderate weather; Lowestoffe and prize in company.
2			
5	S S W		Lat. 22° 8′, long. 69° 35′ W.
10			Turk's Island, S 37° W, distance 18 leagues.
11	.....	Calm	
12			
A.M.			
10	W		
11	W by N		
P.M.			October 4, 1780.
1	W	S S W	P.M. Varying from light to fresh breezes.
2	W ½ S		
5	W		Lat. 21° 54′, long. 71° 0′ W.
7	W N W		Great Caicos, W, distance 10 leagues.
8	S		
9			
10	.....	Calm.	Calm.*
11	S W		

* At this hour, when the Pallas was becalmed, the Phœnix was in the midst of the first hurricane.

CHAP. VIII.

Log of the Pallas.

Extract from the Log of H. M. S. PALLAS—*continued.*

Hour.	Courses.	Winds.	Remarks.
A.M.			October 4, 1780.
5	W		
10	W S W		
P.M.			October 5, 1780.
1	W S W		P.M. Moderate weather.
5	W ½ N		
11	N W by W	Variable	Great Caicos, S E, distance 7 leagues.
A.M.			
6	W		
7	S W by W		
8	W by S		
9	W S W		
P.M.			October 6, 1780.
1	W ½ S		P.M. Fresh breezes and cloudy.
2	W by S		
3	W S W	Ditto	
6	S E by S	S W by S	
Midn.	W by S	S W by W	Midnight. Great Caicos, S E, distance 2 leagues.
A.M.			Lat. 22° 0′.
1	W S W		
8	S S E	S W	
Noon.	W by S	S W	
P.M.			October 7, 1780.
1	W S W		P.M. Light winds and fair; Lowestoffe in company.
2	W by S		
3	W N W		
4	S		
7	S E by E	S W by W	
9	S W	S S E	
11	W S W		
A.M.			
7	S W by W	S E by E	A.M. Little Inegua, bearing S S E, distance 3 leagues.
8	S W		
9	S W by S		Lat. 21° 40′.
10	S S W		
P.M.			October 8, 1780.
1	S S W	S E	P.M. Fresh breezes and cloudy; Lowestoffe in company.
4	S W		
5	S W by S		
7	S W		
11	S by E		
A.M.			
5	S ½ E		A.M. Cape Maze, North, distance 6 leagues.
8	S ½ W		
10	S by W		Lat. 20° 2′ N.
11	S S W		
12	S W by S		

Log of the Pallas.

Extract from the Log of H. M. S. PALLAS—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			October 9, 1780.
A.M. 6	S S W	N E	A.M. Saw the east end of Jamaica; moderate weather.
			October 10, 1780.
P.M. 1	S	Calm.	P.M. *Calm;* ship's head all round the compass.
A.M. 2	S W		A.M. Yellow Hill, W S W, distance 10 leagues.
11	S E		
12	S E by E		Lat. 18° 7′ N.
			October 11, 1780.
P.M. 1	W ½ S		P.M. Moderate and fair; spoke the Ramilies, in company with the Southampton and Jamaica.
4	W S W		
9 } 10 }	.....	Calm.	
11	S S W	S E	
A.M. 2	S W by S		A.M. East end of Jamaica, N W by W, distance 6 leagues.
5	S W		
7	W S W		
			October 12, 1780.
P.M. 1	W S W	S S E	P.M. Fresh breezes.
A.M. 1	.....	N W	
Noon.	.....	N	Noon. Ditto.
A.M. 6	W by S		A.M. Upper White Horses, bearing N W by N, distance 2 leagues.
12	W		
			October 13, 1780.
P.M.	.....	Calm.	P.M. Lowestoffe in company.
			October 14, 1780.
P.M. 5	.....	N W	P.M. Anchored at Port Royal; light winds.
			October 15, 1780.
		N	Light winds.
			October 16, 1780.
		S S W	*Squally.*

CHAP. VIII.

Log of the Lowestoffe.

Extract from the Log of H. M. S. LOWESTOFFE, Captain C. Parker.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
	S 75° W	Variable	Tuesday, October 3, 1780. Moderate breezes and fair; made and shortened sail occasionally; Pallas and prize in company. Lat. 20° 7′, long. 9° 37′.* Mayaguana, S 30° W, dist. 87 leagues.
	S 77° W	S S W	Wednesday, October 4, 1780. Light breezes and fair; made the signal for seeing a sail in the N W; Pallas and prize in company. Lat. 21° 52′, long. 8° 40′. Mayaguana, S 20° W, dist. 60 leagues.
	N 75° W	S E	Thursday, October 5, 1780. Fresh breezes and fair. Half-past 1, saw Turk's Islands, bearing S S W, distance 6 or 7 leagues. At 3, saw East Caicos from the masthead, bearing W by S, distance 3 or 4 leagues; Pallas and prize in company. Lat. 22° 17′, long. 8° 12′ E. Mayaguana, S 20° W, dist. 60 leagues.
P.M.	S 80° W	S S W	Friday, October 6, 1780. P.M. Ditto weather. At 6, the S E part of Mayaguana, W by S, distance 3 or 4 leagues. Lost sight of the Pallas and company. Lat. 21° 55′, long. 7° 50′.
		S W	Saturday, October 7, 1780. Moderate breezes and cloudy; made and shortened sail occasionally. At sunrise, variation, per azimuth, 7° 10′E. Lat. 20° 30′. Little Inegua, N by E ½ E, distance 6 or 7 leagues.
		E	Sunday, October 8, 1780. Squally, with rain at times. At sunrise, Cape Maize, S S W ½ W, distance 11 or 12 leagues; Pallas in company. Lat. 20° 7′. Cape Maize, N N W, dist. 3 or 4 leagues.
P.M.	.....	N E to	Monday, October 9, 1780. P.M. First part fresh breezes. At 6, Cape Maize, N E, distance 12 or 13 leagues.
A.M.	.....	S E Calm.	A.M. At 6, the high land of Grand Ance, E, and the north part of Jamaica, S W ½ S, distance 6 or 7 leagues. Latter part calm; head all round. Lat. 18° 48′. East end of Jamaica, S W ½ S, distance 8 or 9 leagues.

* This log is printed as it was entered in the log-book. It is supposed to be reckoned from the place of last departure.

Log of the Lowestoffe.

Extract from the Log of H. M. S. LOWESTOFFE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
		Calm	Tuesday, October 10, 1780 Calm; head all round; Pallas in company. Lat. 18° 6′. Yallah's Hill, W S W ½ W, distance 13 or 14 leagues.
P.M Noon.	.....	E S E	Wednesday, October 11, 1780. P.M. Light breeze and fair. 1. Made the signal for seeing two sails in the S W. At 2, saw another sail in the S W. At 3, one of the sails made the private signal, which was answered. 4.30. Found the sails to be H. M. ships Ramilies, Southampton, and Jamaica. Noon. Pallas in company. Lat. 17° 45′ Yallah's Hill, W ½ N, dist. 8 leagues.
P.M.	.....	Variable	Thursday, October 12, 1780. P.M. Ditto weather. At 6, Yallah's Hill, W ½ N, distance, off shore, 2 or 3 leagues; Pallas in company. Lat. 17° 51′. White Horses, N W by W ½ W, distance 3 or 4 leagues.
P.M. A.M.	.....	Variable	Friday, October 13, 1780. P.M. Ditto weather. At 6, Salt-pan Hill, W by N; Cow Bay Point, W N W, off shore, distance 2 or 3 leagues. A.M. At 6, Rock Fort, N N W, off shore, distance 4 or 5 miles. Lat. 17° 49′. Rock Fort, N by W ½ W, distance 2 or 3 miles.
P.M.	.....	Variable	Saturday, October 14, 1780. P.M. Light breezes; running down for Port Royal. 4.30. Came to an anchor in Port Royal. Port Royal Point, S; and the Twelve Apostles, W by S.
		Sea and land breezes.	Sunday, October 15, 1780. Light breezes; sent seventeen prisoners to Kingston; moored a cable each way.
		Ditto	Monday, October 16, 1780. Ditto weather.
		Ditto	Tuesday, October 17, 1780. Ditto weather, with rain. Received Vice-Admiral Parker's flag from H. M. ship Tobago, and hoisted on the fore-top-gallant-mast-head.

CHAP. VIII.

Chart IX.

We next find the storm overtaking, on the morning of the 5th, the ships under Admiral Rowley, which were sent by Sir Peter Parker, to convoy a fleet part of the way to Europe: and the Stirling Castle was one of them. These ships suffered greatly; and in their crippled state had likewise the misfortune to meet the great hurricane at a later date.

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON, bearing the flag of Rear-Admiral Rowley.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
1	N by E	E by N	P.M. Light airs and cloudy; made signal to annul the line, and to form the order of sailing.
2			
3			
4			
5	N by W	Variable	
6			Ditto weather.
7	N	E N E	
8	N by E	E by N	
9	N by E ½ E		
10			
11			
12			Ditto weather.
A.M.			
1	N by E	E by N	
2			
3	N N W	N W	A.M. Made signal to tack; tacked ship; squadron in company.
4	E S E		
5			
6	S E by E	Variable	
7	S E	E N E	
8	E S E	N E	Ditto weather.
9			Squally, with rain; handled top-gallant-sails.
10	S E	E N E	Ditto weather.
11	S E by E	N E by E	Set top-gallant-sails.
12	E S E		Noon. No observation. Lat. 29° 19′ N, long. 74° 32′. Walling's Island, S 8° E, distance 154 leagues.
P.M.			Friday, October 6, 1780.
1	S E by E	Variable	P.M. Fresh gales and hazy; squally weather; close-reefed the topsails.
2			
3	E S E		
4			At 4, ditto weather, with rain at intervals; got down top-gallant-yards.
5			
6			

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 6, 1780.
P.M. 7	E S E	Variable	At 7, ditto weather; split the mizen, lowered down the yard, and set a trysail; strong gales and squally, with rain; handed the topsails and courses.
8	Lying-to		At 8, ditto: made signal for lying-to; brought-to under trysail.
9			
10			
11			
12			Midnight. The gale increasing, and a heavy sea from the E N E; carried away the main-topmast, topsail-yard, &c. 12.45. Found the mainmast sprung two feet above the upper deck.
A.M. 1			
2			A.M. At 2, the mizenmast went over the side, and the mainmast immediately followed; the ship labouring much and shipping great quantities of water; people employed clearing the wreck and pumping the ship; two of the upper-deck guns broke loose, one of which went through the main-deck grating, and resting on the lower deck, from whence came a deluge of water; the other being upset was secured at the same time; one of the cabin and forecastle guns broke loose, but were secured; also the shifting iron ballast was thrown overboard at the same time; the tiller breaking she fell off into the trough of the sea, and continued to labour exceedingly; the water in the hold having increased to ten feet, and the pumps and chains being so bad as to prevent working, the people quitted them, and began baleing.
3			At 3, finding the wreck strike very hard under the counter, put up the helm to wear, in order to clear the wreck, but it proved ineffectual.
4			At 4, got another tiller shipped, and the main-hatches secured.
5			At 5, the shank painter of the best bower gave way; cut away the anchor from the bows.
6			At 6, seven feet water in the hold.
7			At 7, cleared the wreck, and threw four of the quarter-deck guns overboard; the people constantly baleing; the ship still labouring much.
8			At 8, the gale seemed to abate.
9			
10			
11			
12			Noon. People employed as before, and preparing to get sail on the ship; all the fleet out of sight.

CHAP. VIII.

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M.	Lying-to	Variable	Friday, October 6, 1780. No observation. Lat. 28° 20′, long. 74°. Caucus, S 7° E, distance 114 leagues.
P.M.			Saturday, October 7, 1780.
1	.....	N N W	P.M. Fresh gales and cloudy, with a great swell; set a top-gallant-sail on the foremast and bore up; saw a ship to the N W with her masts gone; employed pumping the ship and getting ready to rig jury-masts; one of the upper-deck guns broke loose and went through the grating, and lodged upon the lower deck.
2			
3	S E	N W	
4			
5			
6			
7			
8			Ditto weather.
9			
10			
11	S E by S		
12			Ditto weather.
A.M.			
1			
2			
3			
4			A.M. Moderate gales and cloudy.
5			
6			Saw the Trident in the S W, with all her masts gone.
7			
8			Ditto weather.
9			
10			
11			
12			Ditto weather; a swell from the N W; employed at the pumps and at the rigging. Lat. observed, 29° 5′ N.

Log of the Berwick.

Extract from the Log of H. M. S. BERWICK, Captain the Hon. K. Stewart.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
1	N by E	E by N	P.M. Light airs and cloudy.
2	N	Variable	Shortened sail.
3	N N W		Unbent the new mizen-topsail and bent the old.
4			
5			5.30. Wore ship.
6	S W by S		Light airs and cloudy.
7	S S W		The Admiral S W, two or three leagues.
8	S S E		Wore ship.

Log of the Berwick.

Extract from the Log of H. M. S. BERWICK—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
9	N by E	Variable	Handed top-gallant-sails.
10			Ditto weather.
11	N by W		
12			
A.M.			
1			
2			
3	N N W	N E	A.M. At 3, tacked, by signal; set top-gallant-sails.
4	N E by S ½ S		Moderate breezes and cloudy.
5	E S E		
6	S E	N N E	Squally, with heavy showers of rain.
7			
8	S E by E	N E by E	Moderate and cloudy.
9	S E ½ S		
10	S E	E N E	Squally; shortened sail occasionally; the Stirling Castle and Hector's signal was made for their being out of their station; dark, hazy weather.
11	S E by E	N E by E	
12	E S E	N E	Lat. 29° 21′, long. 71°.*
P.M.			Friday, October 6, 1780.
1	E S E	N E	P.M. Fresh breezes and heavy showers of rain.
2	S E by E		At 2.30, double-reefed the fore and main-topsails and close-reefed mizen; heavy squalls of wind and rain.
3	.....	Variable	
4			
5			
6			At 6, in third reef in the fore and main-topsails.
7	S E		At 7, handed the fore and mizen ditto. At 7.30, split the foresail and fore-top-mast-staysail.
8			At 8, handed the main-topsail.
9	up S E by S off S by E		At 9, saw the Admiral, bearing about W S W. At 9.30, bent another foresail, and got down top-gallant-yards.
10			At 10, could not see the Admiral; heavy gales of wind and rain; lying-to under the mainsail, the gale increasing much.
11			
12			About ten minutes before 12, our bow-sprit and foremast went over the side, about thirty feet above the deck, and in the fall carried away the mainyard and mainsail, all split to pieces.
A.M.			
1			
2			A.M. At 2.15, blowing a hurricane; carried away the mizenmast. At 2.30, the mainmast went by the board; hands employed in pumping and clearing the wreck; shipped a great quantity of water, especially in the gun-room and ward-room;
3			
4			
5			
6			
7			

* The Berwick's longitude does not agree with that given in the other logs of the squadron.

CHAP. VIII.

Log of the Berwick.

Extract from the Log of H. M. S. BERWICK—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 6, 1780.
A.M. 8	.....	Variable	owing to the galleries and rudder-coat stove in, great quantity of water went down in the cockpit and bread-room; the ship labouring hard; on examining at daylight, found — of the forecastle guns and two carronades gone overboard; two boats, top-gallant-yards, and steering-sails gone from the booms; stream and kedge anchors, binnacle and compasses from the quarter-deck.
9	up N by E		At 9, saw four sail of ships astern dismasted.
10	off		
11	NE by N		
12			Noon. Employed in clearing the wreck and getting the damaged bread up from the bread-room, throwing it overboard to preserve the remainder from heating; strong gales. By the falling of the mainmast two of the upper-deck guns broke adrift, and by upsetting them the carriages were broke; sundry people much hurt in the gale; on examining the carriages found them unfit for use, and hove them overboard by Captain's order. Lat. 28° 45′, long. 70° 17′.
			Saturday, October 7, 1780.
P.M. 1	up N by E		P.M. Moderate breezes and cloudy.
2	off		At 2.30, the Hector made the signal of distress; employed clearing ship; got up a main-top-gallant-mast for a mainmast, with a top-gallant-sail on it.
3	N by W		
4			
5 }	up N by W		Moderate breezes and cloudy; a heavy swell from the westward.
6 }	off N by E		
7	E by S ½ S	W S W	
8			
9			
10			
11	.....	S W	
12			
A.M. 1	E S E		
2			
3	S E by S		A.M. Ditto weather; a heavy swell from the westward.
4			
5	S E by E	Variable	
6			Light airs; employed in getting out a jury bowsprit and foremast up; three ships dismasted in sight.
7			
8			
9	E S E		
10			Lat. observed, 28° 16′.
11	S E		Employed getting up sheers for the jury-foremast.
12			Ditto weather. Lat. 28° 19′, long. 70° 29′.

Log of the Trident.

Extract from a Journal of the Proceedings of H.M.S. TRIDENT, Captain J. A. P. Molloy.—In *Nautical Time*.

Hour.	Courses.	Winds.	Remarks.
			Thursday, October 5, 1780.
P.M. 1	N N E	E	P.M. Light airs; Admiral made the signal to disannul the line.
2			
3			
4	N by W	Variable	
5	N ½ W		Admiral called in all cruisers.
6			
7	N		
8			
9			
10			
11	N by E		
12			Ditto weather.
A.M. 1			
2	W		
3	N N W		
4	E S E	N E	A M. Tacked by signal.
5			
6			
7			
8			Light breezes and cloudy, with heavy rain.
9			
10	SE by E	NE by E	Squally, with rain.
11			
12			Ditto weather. Lat. 29° 17′ N. Bermudas, N 75′ 3′, distance 145 leagues.
			Friday, October 6, 1780.
P.M. 1	E S E	N E	P.M. Fresh breezes and squally, with heavy rain.
2			
3			In second-reef topsail; down top-gallant-yards.
4		"	
5	SE ½ E		Split main-topsail; repaired it.
6			Squally; split main-topmast-staysails and jib; bent others.
7			Handed fore and mizen-topsails.
8			Heavy squalls, with rain.
9	S S E	E	Admiral made signal to bring-to on the larboard tacks.
10	.....	E by N	Hauled the foresail up.
11			Handed main-topsails, bunted the main-sail, and brought-to under mizen-staysail.
12			Heavy gales and violent squalls and rain; bunted the foresail.
A.M. 1	up SE by S		A.M. Main-topmast went away.
2	off S		Mizenmast went over the side, with all the sails and rigging, clearing the wreck away.
3			
4			Excessive heavy squalls; carried away the foremast, and with it the best bower anchor, sails, and rigging.

CHAP. VIII.

Log of the Trident.

Extract from the Log of H. M. S. TRIDENT—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M.			Friday, October 6, 1780.
5	up SE by S off S	E by N	At 5, the mainmast went over the side; lost every thing belonging to it.
6			People employed clearing the ship of the wrecks.
7	up NE by N	NWbyN	
8	off E N E		
9			
10	up N by W	W by N	
11	off N N E		
12			Hard gales and cloudy; no ship in sight. Lat. 28° 18′ N. Bermudas, N 68° 3′ E, dist. 153 leagues.
P.M.			Saturday, October 7, 1780.
1	up N N W	W	P.M. Strong gales and hazy; employed clearing ship and getting jury-masts.
2	off N		
3			Got a top-gallant-mast for foremast, another for a mainmast, and the long-boat mast for a mizenmast.
4			
5			
6	E by S	S W	More moderate; made sail under jury-masts.
7			
8			
9			
10	S E		
11			
12			Moderate and cloudy.
A.M.			
1			
2			
3			
4			
5			
6			
7	S E ½ E		A.M. Fitting rigging for the jury-masts.
8			
9	E S E	Variable	
10	E		
11			Employed getting a top-gallant-mast for a foremast.
12	N N W		Light airs; no ship in sight. Lat. 28° 3′ N. Bermudas, N 67° 52′ E, dist. 140 leagues.

Their jury-masts.

Log of the Hector.

Extract from the Log of H.M.S. HECTOR, Captain Sir John Hamilton.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
	N by E	E by N	P.M. Light airs and fair at 50 min. past noon; the squadron being in a line, the signal was made to discontinue; answered
2	N by E	E by N	

Log of the Hector.

Extract from the Log of H. M. S. HECTOR—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
3			per signal, and immediately made sail.
4	S S E	E	At 3, wore ship to get into our station.
5			At 4, hauled our wind to the northward;
6			the Admiral, N N W ½ W.
7			At 6, light breezes; the Admiral, N W
8			by N. 6.30. Hoisted in the boat. At 8,
9	N N E ½ E	E by S	the Admiral, N W ½ W, distance half a
10			mile; light airs and cloudy. At 12, the
11	N by E	E by N	Admiral, N W, distance half a mile.
12			A.M. At 3, tacked ship, per signal, to
A.M.			the S E. At 4, the Admiral, S by E.
1	N	E	At 5, squally, with rain, thunder, and
2	N by W		lightning; found the slings of the main-
3	N by W ½ W		yard broke; got them down; employed
4	S E by E	NE by E	fitting another pair. At 8, moderate and
5			dark cloudy weather; the Admiral, S by E.
6			Fresh gales and passing squalls. At 11.25
7	.....	N E	the Stirling Castle's and Hector's signal
8			was made for being out of their station.
9	S E ½ S	E N E	Answered, per signal, and bore down upon
10			the Grafton's lee quarter. At noon, she
11	E S E	N E	bore E by N ½ N, distance half a mile.
12			No observation.
P.M.			Friday, October 6, 1780.
1	S S E	E	P.M. Strong gales and squalls. At 5, got
2			down top-gallant-yards and close-reefed the
3			topsails; ditto, handed the mizen-topsail.
4			At 7, the gale increasing and sea running
5	S E ½ E	NE by E	high, took in the fore-topsail. At 8, the
6			Grafton not in sight; wore ship to the
7	S E by S	E by N	northward, and at 8.30, to the south. At 9,
8			hove-to, per signal; do., handed main-top-
9	N / S	E N E / E S E	sail and courses under balance-mizen and mizen-staysail. At 12, the main-topmast
10	up S S E		went over the side; the gale increased to
11	off		a hurricane. At 1 A.M. the mizenmast
12	S by E		went over the side; at 1.30, the foremast
A.M.			went likewise, and a few minutes after the
1			mainmast went over the side; found the
2	up S E by S		foremast by the fall carried away the stop-
3	off		per of the best bower anchor, that we were
4	S by E		obliged to cut it from the bows with the
5			rest of the wreck; found the ship had
6			water in the hold, over the second tier of
7			casks; upon sounding of the well, found 9½
8			feet water in; turned all hands down to the
9			pumps; some chosen seamen only kept
10			upon deck to clear the wreck; she shipped
11			many heavy seas, which broke loose all
12			our shot, &c.; the longboat received great
			quantities of water; scuttled her in order
			to save her; hove over seven of the upper-
			deck guns, and four of the quarter-deck
			ditto; off the forecastle one gun, likewise

CHAP. VIII.

Log of the Hector.

Extract from the Log of H. M. S. HECTOR—*concluded*.

Hour.	Courses.	Winds.	Remarks.
			Friday, October 6, 1780.
			all the shot from both decks, with every loose thing to ease the ship. At daylight, found the small bower anchor hanging by the flukes; cut it away, with every other part of the wreck we had not seen before, so that by 10 o'clock we were quite clear of the wreck; when the weather began to clear away, saw three of the squadron in the same situation as ourselves. Lat. 28° 28′.
			Saturday, October 7, 1780.
P.M.			
1	up NNW off N		P.M. Still hard gales, with a heavy sea
2	S E ½ E	N W	from the westward; some of the ship's
3			company employed getting clear the decks,
4			and fitting a top-gallant-sail; hoisted it up
5	S E		to the stump of the foremast, to get the
6			ship before sea. All the rest of the ship's
7			company at the chain and hand-pumps.
8			
9	S E ½ S	W N W	
10			The ship labouring very much, and
11			shipping a great quantity of water, and
12			five feet water in the hold.
A.M.			
1			
2			A.M. At 2, freed her; employed clearing
3			away the booms, and getting the topmasts
4			out for jury-masts; got up the upper and
5	S S E	W N W	quarter-deck guns that overset in the gale.
6			
7			
8			Served out drams to the people every four
9			hours while pumping the ship out. At
10			noon, saw a sloop standing to the S E;
11			the ships in company.
12			Lat. 28° 19′ N.

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL, Captain Glover.

Hour.	Courses.	Winds.	Remarks.
			Thursday, October 5, 1780.
P.M.			
1	N N E	E	Light breezes and fair weather.
2			The Admiral made the signal to annul
3	N by E	E by N	all signals.
4			Ditto weather.
5			
6	N	E N E	

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 5, 1780.
7			
8			
9	N by E	E by N	
10			
11			
12			Light breezes and fair weather.
A.M.			
1	N N E	E	
2			
3			
4			Tacked, per signal.
5	E S E	N E	
6			
7			Squally, with rain.
8	S E by E	N E by E	
9	E S E	N N E	
10	S E ½ E	E N E	In second reef of topsails; the Admiral made the Hector's and Stirling Castle's signal for being out of their station.
11			Cloudy, with some rain.
12			No observation. Lat. 29° 32′, long. 73° 58′. Crooked Island, S 1° 50′ E, distance 132 leagues.
			Friday, October 6, 1780.
P.M.			
1	S E	E N E	P.M. Fresh breezes and rain.
2			
3			Ditto weather; the Admiral, E S E, distance 2 miles; in first-reefed topsail.
4	S E by E	N by E	Split the fore-topmast-staysail; bent a new ditto.
5	E S E	N E	In second-reefed topsail, and down top-gallant-yards.
6			Split the main-topmast stay; bent a new one.
7	S E by E	N E by E	Fresh gales; in third-reefed topsail, and handed ditto.
8	S E	E N E	Ditto weather; up foresail, and brought-to under the mainsail; heard two guns in S E quarter.
9			Hard gales; hauled up the mainsail, and brought her under the balance mizen.
10	up S E off		Ditto weather; carried away the fore and main top-gallant-mast.
11	S W by S		Carried away the mizenmast; employed in clearing the wreck, which carried away the main-topsail-yard; found the ship to make much water; 3½ feet in the well; pumps constantly at work.
12			
A.M.			
1	up N N E off E	A sudden shift of wind.	A.M. At 1, the mainmast went in the parteners, which carried with it the main-topmast, sprung the gallows, stove the longboat, cutter, and yawl, colour chest from quarter-deck, binnacle with azimuth,

The Stirling Castle.

CHAP. VIII.

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M.			Friday, October 6, 1780.
	up N N E off E		two common compasses, the gunner's stores.
2			At 2.15, the foremast went by the board, carried with it the fore-top-gallant and
3		N W	yard, with gunner's stores in the top, complete; royal top and top-gallant steering-
4			sail with rigging full; dismounted one forecastle gun, and did other material damage; seamen clearing the wreck; ship
5			made much water, 5 feet in the well,
6			pumps constantly at work. At 6, the bowsprit went with the wreck forward. At 6.30, cleared the wreck of the ship, and clearing the ship of lumber.
7	up N		At 7, hard gales; employed in getting
8	off	W N W	the ship in a state of safety; shipped much
9	E by N		water, pumps still at work. At 9, the gale somewhat abated; saw two ships having lost their masts, supposed to be the Ruby
10			and Hector. At 10, the Hector passed very
11			near us. At 11, employed in getting spare
12			spars as jury-masts; the ship made less water. At meridian, gale abated, and clear; saw a ship, supposed to be the Berwick, with stumps; three sail in sight. Lat. 28° 41′.
P.M.			Saturday, October 7, 1780.
1	Lying-to up N by E		P.M. Fresh gales, and a great swell from
2	off N E by N		the N W; in company with the Ruby and Hector; the gale abating and clear.
3		N W	Saw in the S E three ships in company; a strange sail, ditto quarter.
4			The Hector made signal of distress, bore
5	S E	W N W	down to join her.
6	S E by E	S W by W	
7		W S W	Moderate breezes and fair weather; em-
8			ployed in getting jury-masts ready.
9			
10			
11			
12			Moderate breezes, with a great swell from the N W; three ships in company.
A.M.			
1			
2	S S E	W	
3			
4			
5			
6			A.M. Saw a strange sail in the SE quarter.
7			Turk's Island, S 18° E, dist. 145 leagues.
8			Employed rigging a jury-foremast, with
9	.....	Calm	the spare topmast, and ditto topsail for a
10			foresail.
11			Lat. observation, 28° 20′.
12			

Log of the Ruby.

Extract from a Journal of the Proceedings of H.M.S. Ruby, Captain John Cowling.

Hour.	Courses.	Winds.	Remarks.
			Thursday, October 5, 1780.
A.M.	Not in log	E by N	A.M. Light airs and cloudy; made and shortened sail occasionally; squadron in company.
			Friday, October 6, 1780.
12	.....	N E	Fresh breezes and squally; made and shortened sail, and tacked occasionally; very heavy gales. At 12, the mizen-stay-sail blew overboard, bent another; the Admiral's light, N by E; the mizen and mizen staysail blew overboard. P.M. At 2.30, the foremast went by the board, and carried away the best bower, and cut the cable. At 3, the mizenmast went by the board, ten feet above deck. 3.15. The mainmast went by the board, and stove two of the boats; lost three tons of water casks from the quarter, and two ditto from the upper and quarter decks; violent heavy gales, ship very laboursome. At 5.30, hove overboard ten of the 9-pounders to ease the ship; cut the wreck of the masts away; saw three of the squadron dismasted; got the cutter's foremast to the weather cat-head, and set the sail and wore ship to get clear of them; employed rigging a jury-foremast; Berwick, Bristol, and Hector in company. Lat. 28° 20′.
P.M.			
2.30			
3			
3.15			
5.30	..	E N E	
		N N W	
			Saturday, October 7, 1780.
A.M.			A.M. Moderate and clear, the clouds much fallen; three dismasted ships in sight; found six puncheons of rum stove entirely. At 4, the Berwick made signal for the ships to the S E to join him; two ships in sight, bearing N by E, 1 ditto, N N W, distance 4 miles; saw a strange sail to the northward; employed getting up jury-masts. Lat. 28°.
4		N W	
		W N W	
			Sunday, October 8, 1780.
P.M.			P.M. Ditto weather; employed getting up jury-masts. At 2, saw the above sail, a sloop bearing down upon us. At 5, got a jury-mizenmast up; and at 8, a jury-foremast; Bristol and Hector in company; Berwick in sight, set fore-top-gallant-sail
2	Not in log		
8			

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Log of the Ruby.

Extract from the Log of H. M. S. RUBY—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 8, 1780.
A.M. 10	.....	Variable	for a foresail; a heavy, confused sea; employed getting up a jury-mast. At 10 A.M. saw a sail in the S E; Bristol and Hector in company. Lat. 28° 27′.

The next document is an extract from a report made by Sir George Rodney, and addressed to the Secretary of the Admiralty. The squadron he alludes to was further removed from the centre of the storm; and two of the ships' logs will be sufficient here to show in what way they were affected by it. The place of this squadron, which was under Captain Affleck's orders, is marked on the Chart.

On referring to the log-books of Admiral Arbuthnot's squadron, I found the Shrewsbury off Rhode Island, and employed blockading the French squadron, commanded by Admiral Ternay. On the 8th of October, 1780, by the Shrewsbury's log, the wind veered from E. N. E. to N. E., then N. N. W. and W. N. W., *with strong gales and squalls, with rain.* The Sandwich, lying at Sandy Hook, had fine weather.

Extract from a letter from Admiral Rodney to Mr. Stevens, dated on board the Sandwich, off New York, October 20, 1780.

"I must desire you will be pleased to acquaint their Lordships that the squadron of ships and frigates which I stationed off the Delaware received very considerable damage in a violent gale of wind; and most of them have been obliged to return to port in a crippled condition. The Terrible and the Cyclops lost their mizenmasts; the Guadaloupe was compelled to throw some of her guns overboard; and almost every ship was so much damaged as to be obliged to return into port."

Log of the Terrible.

Extract from a Journal of the Proceedings of H. M. S. TERRIBLE, kept by Lieut. Benjamin Forest.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 6, 1780.
P.M. 6	S 23° W		P.M. Fresh gales and hazy weather. At 6, we made signal for a strange sail in the NE. At 9.30, saw three in the NW quarter. At 10.30, the signal for the ships to the windward to make more sail; ditto the signal to chase in the west. At 11, shortened sail and hove-to; the Triumph brought-to the chase at noon; fresh gales and thick hazy weather; sounded at different times, and tacked occasionally, as per signal.
9			
10			
11	.....	NW b W	
			Cape Henry, S 65° W, distance 74 miles.
			Lat. 36° 29′ N, long. 74°.
			Saturday, October 7, 1780.
P.M. 3	S 40° E		P.M. Fresh breezes and squally, with rain. At 3, unbent the mainsail, being split; William Underhill, a soldier, fell overboard, and was drowned. At 4, employed setting up the mizen rigging. At 8, carried away the larboard clew of main-topsail; handed the sail. At 2 A.M. unbent the main-topsail and sent it down. At 7.30, the mizenmast went away; employed cutting away the wreck. At 10, mainsail, in hauling up, split to pieces and blew away; found the mainmast sprung in the lower decks; lowered down the mainyard; employed repairing the damages; ditto weather.
4			
8			
A.M. 2	.....	E by N	
7			
10			
			Cape Charles, N 56 W, distance 48 leagues.
			Lat. 35° 39′ N, long. 73° 50′.
			Sunday, October 8, 1780.
P.M.	N 77° E		P.M. Strong gales and hazy weather; carpenters employed making a fish for the mainmast; sailmakers employed repairing the mainsail; people employed setting up the rigging. At 6, saw five sail, two to NE, three to SW, supposed to be some of our cruisers; bent a foresail for a mainsail; bent a main-topsail. At 11, spoke H. M. S. Triumph and Cyclops frigate; people employed repairing the rigging.
6	.....	N N W	
11			
			New York, N 11° W, distance 58 leagues.
			Lat. 36° 20′ N, long. 73° 17′.

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Log of the Terrible.

Extract from the Log of H. M. S. TERRIBLE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M. 6 12	N 34° W	N E by E	Monday, October 9, 1780. P.M. Moderate and cloudy weather; employed about the rigging and sails; carpenters fishing the mainmast and jury-mizenmast. At 6, up main-top-gallant-mast and yard ditto. At 12, got up the main-topmast for a mizenmast; employed rigging it; tacked occasionally, as per signal. Sandy Hook, N 9° W, distance 75 leagues. Lat. 36° 48′ N, long. 73° 40′.

Log of the Triumph.

Extract from a Journal of the Proceedings of H.M.S. TRIUMPH, kept by Lieut. W. A. Otway.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M. 10 A.M. 6 8	S 23° W	N N E NE by N	Friday, October 6, 1780. P.M. Throughout strong gales and hazy; made the signal for all cruisers. At 10, saw the flash of a gun ahead. At 6 A.M. wore ship, in company with the Terrible; a frigate to the windward: made the private signal, which we take to be the Triton. At 8, saw a strange sail in the N W; set fore-trysail. At 11, came up with the chase, brought-to, and sent a boat on board; she proved to be a ship from Philadelphia, captured by the Retaliation cutter, and bound to New York. Soundings, 18 fathoms. Cape Henry, N 75° W, distance 39 leagues. Lat. 36° 28′ N, long. 73° 49′.
P.M. 4 A.M. 5 6 8	S 43° E	N E by N	Saturday, October 7, 1780. P.M. Throughout strong gales, with rain, At 4, the squadron in company; furled the main-topsail. At 5 A.M. the fore tack broke; up foresail, and furled it; excessive hard gales and a heavy sea; hauled the mainsail up, and set the foul weather mizen-staysail. At 6, four feet water in the hold; set all the chain-pumps to work. At 8, endeavoured to furl the mainsail, but could not perform it; saw the Terrible, with her mizenmast carried away; quoined the lower-deck guns, it still continuing to blow excessively hard; lost sight of the Terrible. Cape Hatteras, S 76° W, distance 48 leagues. Lat. 35° 45′, long. 73° 5′.

Log of the Triumph.

Extract from the Log of H. M. S. TRIUMPH—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 8, 1780.
P.M.	N 77° E	N W	P.M. First part, very hard gales and hazy weather; middle and latter, moderate and cloudy. At 2, saw four sail; set mainsail and fore-staysail. At 9, set the topsail. At 6 A.M. the Terrible in the S E, her mizen gone, and mainyard lowered down; saw the Cyclops to the eastward, with her mizenmast carried away; one of the ships in the S W fired several guns; three sail in that quarter; made the private signal to ships in the S W. At 9, bore away for the Terrible; out second-reef foresail; in company with the Terrible and Cyclops.
2			
9			
A.M.			
6			
9	.....	N N W	Sandy Hook, N 11° W, distance 99 leagues. Lat. 36° 10′ N, long. 72° 41′ W.
			Monday, October 9, 1780.
P.M.	N 34° W	N N E	P.M. Light airs and cloudy; up top-gallant-yards, out first reefs. At 3, tacked ship; a ship ahead; made the private signal, which we answered; found the knee of our head very much damaged, particularly the part which secures the gammoning of the bowsprit; carpenters employed repairing it. At 6, spoke H.M.S. Triton. At 7 A.M. one of the ships astern made the signal of distress; brought-to, wore, and stood towards her; she proved to be the Boreas, with the head of her rudder broken off, and her mainmast sprung in two places. At 11, made sail.
3			
6			
A.M.			
7	.....	N N W	
11			Sandy Hook, N 11° W, distance 74 leagues. Lat. 36° 49′ N, long. 73° 14′.

This is as far as the hurricane, which destroyed Savanna-la-Mar on the 3rd of October, 1780, has been traced.

The Great Hurricane of 1780.

See Chart IX.

It has been stated that Sir George Rodney was off New York during the occurrence of the hurricanes of October, 1780. He had left the command in the Leeward Islands to Admiral Hotham, who, with his flag on board the Vengeance, and having with him the Montagu, Egmont, Ajax, Alcmene, Amazon, and some other vessels of war, was in the Careenage at St. Lucia, with his ships moored across the entrance of that harbour. The Albemarle was in Carlisle Bay, Barbados. The Endymion, with the Andromeda and Laurel, were cruising on the east side of Martinique; and the Venus, Convert, and Surprise, were cruising among the northern Antilles Islands.

The storm, coming from the *south-east*, was first felt at Barbados; and the ships of Admiral Hotham's squadron experienced the hurricane each in turn, according to the place she was in; and it will be found to have passed on, until it reached the ships under Sir Peter Parker.

The Deal Castle was wrecked on Porto Rico. The Ulysses and Pomona, with the fleet under their convoy, were in the Mona Passage; and we find them suffering greatly, and almost in the centre of the storm.

The Diamond and the Pelican had been sent to Honduras, convoying merchant ships, and had felt nothing of the first hurricane; but, on their return towards Jamaica, though on somewhat different courses, both ships came within the influence of the Great

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Hurricane about the 15th of October, as will be seen on reference to their logs, which have been printed, and to their places as marked on the Chart IX.

The Pallas and the Lowestoffe had, most fortunately, left their cruising ground just before the hurricane passed over it. On the 13th they were becalmed; and on the 14th anchored at Port Royal, Jamaica; and there, on that day, the wind was *north-west*. On the 15th it became *north*, though light. On the 16th, by the log of the Pallas, it veered round to the *south-south-west*, with squalls, thus indicating that a slight influence of the hurricane was felt at Port Royal. The storm, as marked on the Chart, is confined to that space over which it was violent.

The Thunderer, bearing the broad pennant of Commodore Walsingham, had just arrived from England; and, in her way to Jamaica to join Sir Peter Parker, had touched at St. Lucia. She foundered in one of these storms; but where, and on what day, never has been ascertained.

The Chart shows the position of Admiral Rowley's already disabled ships when the second hurricane reached them. The Stirling Castle, which belonged to this squadron, was wrecked by striking on Silver Keys after the storm.

The Berwick had separated from this fleet after the hurricane of Savanna-la-Mar, and was proceeding to England under jury-masts. She had reached north of the latitude of Bermuda when the second hurricane overtook her; and by her track and log-book we are enabled to ascertain the direction taken by this storm.

On reading the logs of these ships, and the various accounts of this hurricane, and comparing the different

reports of the wind, it will be found, that no storm yet described more strongly proves than this the rotatory nature of hurricanes; and, after attentive consideration of this tempest, in addition to the details of so many others, it seems difficult to refuse belief to this being their mode of action. The centre of the circle would appear to have passed just to the north of Barbados, and thence over the middle of the Island of St. Lucia: so that Admiral Hotham's ship, the Vengeance, which remained in the Careenage to ride out the gale, was in the right-hand semicircle of the storm; whilst the ships which cut, or parted their cables, and ran first to the southward, were for awhile in the left-hand semicircle. These last appear to have been dismasted, and the Vengeance driven on shore, just as the centre of the storm was passing between them.

The three ships to the eastward of Martinique being in the right-hand semicircle, had the gale from the eastward, and were therefore upon a lee-shore. By the log of the Endymion, it will be seen that ship just cleared the north-east point of the island; but the Andromeda and Laurel were wrecked, and twenty-five men of the crew of the Laurel alone were saved. These men, of course, were made prisoners; but were sent by the Marquis de Bouillé to the British Governor at St. Lucia, with a letter expressing that he could not detain them as prisoners, from the chances of a catastrophe common to all.

An application having been made, at my request, by Viscount Palmerston, to the French Government, for any information which they could afford relative to the Great Hurricane of 1780, an extract from a report on the subject, made by the "Intendant of

CHAP. VIII. Martinique" to the Minister of Marine, was received from France.

The extract proves the wind to have veered at Martinique, as may have been expected, according to the apparent law of storms in the northern hemisphere; and throughout shows that the towns and fishing villages suffered even more from the extraordinary height to which the sea rose, than from the wind.

Such a portion only of this document is printed as is still of interest.

Coup de vent: désastres de St. Pierre.

"Le vent qui régnait de la partie de l'E.N.E. étant devenu assez fort dans la journée du 11 Octobre, plusieurs des bâtimens du convoi déradèrent et furent portés au large. Il augmenta de plus en plus et devint très violent. Il se rangea ensuite à l'E.S.E et bientôt après au S. et à l'O. en varient avec autant de rapidité que d'impétuosité. Alors tout ce qui restait sur la rade fut entrainé à l'exception de trois petits bâtimens caboteurs. *Ceux de convoi disparurent* avec beaucoup de bâteaux et de goëlettes, soit de la colonie, soit des autres iles Françaises ou neutres.

French convoy.

The swell.

"Un raz de marée des plus furieux mit le comble au malheur que l'on éprouvait; il détruisit dans un instant plus de 150 maisons au bord, dont trente ou quarante nouvellement bâties; celles qui étaient derrière furent enfoncées en grand partie; et les marchandises qu'elles contenaient entièrement perdues. C'est avec beaucoup de peine que les particuliers qui les habitaient, sont parvenus à se sauver.

"Le Fort St. Pierre construit il y a environ 120 ans, a été également detruit, à l'exception des magasins.

"La mer a fait dans les bourgs surtout à St. Pierre, beaucoup plus de mal que le vent; *la lame y a monté jusqu'à vingt-cinq pieds.*

La Dominique.

"Le vent et la mer ont fait les plus grands ravages à la Dominique. Plusieurs bâtimens caboteurs ont été jettés à la côte. Presque toutes les maisons du bord de mer ont été emportées, ainsi que les magasins du Roi, la boulangerie et une partie des casernes.

"Le désastre a été encore plus affreux a St. Vincent, et les pertes plus considérables. La frégate la *Junon* qui venait d'y arriver y a péri.

St. Vincent.

"Des 600 maisons qui composaient le bourg de King's-town il n'en reste que 14. Les autres ont été rasées. La campagne a été entièrement dévastée, et tous les habitans sont exposés à la plus affreuse misère.

La Grenade.

"Il y a eu peu de mal à la Grenade; quelques bâtimens s'y sont échoués, mais nous n'avons pas appris que l'ile ait souffret.

Guadeloupe et Marie Galante.

"La Guadeloupe a reçu quelques dommages dans des plantations; le raz de marée en a fait beaucoup à la basse terre, et en d'autres quartiers de la colonie.

"Marie Galante a été epargnée en grande partie.

St. Eustache.

"Il n'en a pas été de même de St. Eustache. La mer y a fait aussi beaucoup de mal, elle a considérablement monté et a inondé une grande partie des Magasins du Commerce."

A Danish report, also procured for me by Viscount Palmerston, was made by Captain Stockfleth, who commanded the frigate Christiana, to the Danish Admiralty. This ship met the hurricane on the 13th of October, 1780, when south-west of Porto Rico; but the direction of the wind is not given.

This report states, that only six or seven ships of the French convoy at Martinique were saved; and from Sir Peter Parker's Report, printed at page 302, we learn that there were 5000 troops on board.

From St. Lucia, the centre of the storm appears to have passed over, or very near to, the Island of Mona, on the morning of the 15th of October; and, when we take up the logs of the Venus and Convert, which were on one side of the storm at that date, and those of the Diamond and Pelican, which were on the other side of it, we find the wind blowing in contrary directions.

On referring to the logs of ships lying in the harbour of Antigua, we there find the wind blowing in squalls;

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at first coming from the east-north-east, then veering by the *east* to the *south-east*, in strict accordance with the apparent law of storms in the northern hemisphere.

The squadron of Admiral Rowley, being in latitude 26° 30′ (about which latitude we find hurricanes so frequently change their direction and set towards the eastward), first received the storm easterly. As the gale proceeded towards the north-east, this squadron was in its left-hand semicircle; and the Chart shows the manner in which the ships then ran to the south-east, with the gale at north-west.

By referring to the log-books of H. M. ships Shrewsbury and Resolution, it appeared that they were underweigh off Long Island on the 18th of October, 1780. The weather had been fine for some time, both before and after; and the only exception was that day, when it blew in squalls, so as to make these ships strike their top-gallant-masts, and the Shrewsbury split a topsail, the wind becoming *north*.

At Bermuda, fifty vessels were driven on shore on the 18th of October; and we have here the log of the Berwick for that day, when she was to the northward of that island, from which we get the direction of the wind.* Thus the Great Hurricane is traced beyond Bermuda, moving in the direction of the Azores; and if this same storm was really the cause of the Shrewsbury and the Resolution striking their top-gallant-masts, and they increase in diameter as they proceed towards the Poles, this storm, on reaching the latitude of Great Britain, may have given a circular direction

* The wind, as laid down from the Berwick's log-book, accords with the reports of living witnesses (1839) at Bermuda; and this storm is there still referred to as the greatest ever experienced in their latitude.

to the wind over an extent equal to the width of the Atlantic from the British Islands to Newfoundland. But the extent of the storm marked on the Chart is confined to the space where it was violent.

Copy of an account of the hurricane of the 10th of October, 1780, which was sent to Lieutenant-General Vaughan, Commander-in-Chief of the Leeward Islands; and by him transmitted to Lord G. Germaine. Copied from the *Gentleman's Magazine* of 1780.

"The evening preceding the hurricane, the 9th of October, was remarkably calm; but the sky surprisingly red and fiery. During the night much rain fell.

"On the morning of the 10th much rain and wind from the *north-west*.

"By 10 A.M. it increased very much.

"By 1 P.M. the ships in the bay drove.

"By 4 P.M. the Albemarle frigate parted and went to sea, as did all the other vessels, about 25 in number.

"By 6 P.M. the wind had torn up and blown down many trees, and foreboded a most violent tempest. At Government House* every precaution was taken to guard against what might happen: the doors and windows were barricaded, but it availed little.

"By 10 P.M. the wind forced itself a passage through the house from the *north-north-west;* and the tempest increasing every minute, the family took to the centre of the building, imagining, from the prodigious strength of the walls, they being three feet thick, and from its circular form, it would have withstood the wind's utmost rage;

11h. 30m. however, by half-past eleven they were obliged to retreat to the cellar, the wind having forced its passage into every part, and tore off most of the roof.

* The Governor of the Island of Barbados, in October, 1780, was James Cunninghame, Esq.

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"From this asylum they were soon driven out; the water, being stopped in its passage, having found itself a course to the cellar, they knew not where to go. The water had rose four feet, and the ruins were falling from all quarters.

"To continue in the cellar was impossible; to return to the house equally so. The only chance left was making for the fields, which at that time appeared equally dangerous. It was, however, attempted; and the family got to the ruins of the foundation of the flagstaff, which soon after giving way, every one endeavoured to find a retreat for himself. The Governor and the few that remained were thrown down; and it was with great difficulty they gained the cannon, under the carriage of which they took shelter. Their situation here was deplorable; many of the cannon were moved; and they had reason to fear that the one under which they sat might be dismounted and crush them by its fall, or that some of the ruins which were flying about might put an end to their existence; and, to render the scene still more doubtful, they were near the powder-magazine. The armoury was levelled to the ground, and the arms scattered about.

"Anxiously did they look for break of day, flattering themselves that with the light they would see a cessation of the storm; yet, when it appeared, little was the tempest abated. Nothing can be compared with the terrible devastation that presented itself on all sides: not a building standing. The trees, if not torn up by the roots, were deprived of their leaves and branches; and the most luxuriant spring changed, in this one night, to the dreariest winter.

"It is yet impossible to make a calculation of the number of souls that have perished: whites and blacks together, it is supposed to exceed some thousands. Many were buried in the ruins of the buildings; many fell victims to the weather; and a great number were driven into the sea, and there perished. The troops suffered inconsiderably, though their barracks and hospital were early blown down. What few public buildings there were, are fallen in the wreck: the fortifications have suffered considerably. The buildings were all demolished; for so violent was the storm here, *when assisted by the sea*, that a 12-pounder gun was carried from the *south* to the *north* battery, a distance of 140 yards.* The loss to this country is immense: many years will be required to retrieve it.

"Alarming consequences were dreaded from the number of

* On its carriage, of course, which had wheels.

dead bodies which lay uninterred, and from the quantity of fish the sea threw up; but these alarms soon subsided."

"At St. Christopher's, many vessels were forced on shore.

"At St. Lucia, all the barracks and huts for his Majesty's troops, and other buildings in the island, were blown down, and the ships driven to sea; and the Amazon, Captain Finch, miraculously escaped foundering.

"At Dominica, they suffered greatly.

"At St. Vincent, every building was blown down, and the town destroyed.*

"At Grenada, nineteen sail of loaded Dutch ships were stranded and beat to pieces.

"At Martinique, all the ships were blown off the island that were bringing troops and provisions. On the 12th, four ships foundered in Fort Royal Bay, and the crews perished. The other ships were blown out of the roads. In the town of St. Pierre every house is blown down, and more than 1000 people have perished. At Fort Royal, the cathedral, seven churches, and other religious edifices; many other public buildings, and 1400 houses, were blown down. The hospital of Nôtre Dame, in which were 1600 sick and wounded, was blown down; and the greatest part of these persons buried in the ruins. The number of persons who perished in Martinique are said to have been 9000.

"At St. Eustatia, the loss was very great. On the 10th of October, at eleven in the morning, the sky on a sudden blackened all round; it looked as dismal as night, attended with the most violent rain, thunder, lightning, and wind, ever known before. In the afternoon the gale increased. Seven ships were driven on shore near North Point, and dashed to pieces on the rocks, and their crews perished. Nineteen vessels cut their cables and went to sea; and only one is yet returned. In the night, every house to the northward and southward was blown down, or washed away with the inhabitants into the sea, a few only escaping. The houses to the east and west were not so much hurt till the afternoon of the 11th, when the wind on a sudden shifted to the eastward; and at night it blew with redoubled fury, and swept away every house. The old and new forts, the barracks and hospital, the cathedral, and four

* St. Vincent and Grenada then belonged to the French.

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churches, stood. Between 4000 and 5000 persons are supposed to have lost their lives in St. Eustatia."—*Annual Register* for 1780, p. 297.

Extract from Sir George Rodney's official report of the hurricane of the 10th of October, 1780, at Barbados.

Sir George Rodney's letter.

"No naval stores of any kind can be got at Barbados or St. Lucia, owing to the dire effects of the hurricane which happened on the 10th of October.

"It is impossible to describe the dreadful scene it has occasioned at Barbados, and the condition of the miserable inhabitants. Nothing but ocular demonstration could have convinced me that it was possible for the wind to cause so total a destruction of an island remarkable for its numerous and well-built habitations; and *I am convinced that the violence of the wind must have prevented the inhabitants from feeling* the earthquake, which certainly attended the storm. Nothing but an earthquake could have occasioned the foundations of the strongest buildings to be rent: and so total has been the devastation, that there is not one church, nor one house, as I am well informed, but what has been destroyed. * * * * *

"I leave their lordships to judge how much my concern must have been heightened upon the report made to me, of the loss his Majesty and the public had sustained in the destruction of ships of war, and the gallant officers and men belonging to them, a list of which I have the honour to enclose. But I hope some of them have escaped and arrived at Jamaica, to which island I shall despatch an express, acquainting Sir Peter Parker with the great disaster which has happened, and request and demand his assistance, in not only hastening such of my squadron as may have escaped the hurricane and arrived at Jamaica, to rejoin me, without loss of time, with the Thunderer and the Berwick, in pursuance to the orders he received by Commodore Walsingham."

Extract of a letter to Lady Rodney, dated St. Lucia, 10th December, 1780.

"I sailed from New York on the 16th November, and arrived at Barbados on the 5th of this month.

"You may easily conceive my surprise, concern, and astonishment, when I saw the dreadful situation of this island and the destructive effects of the hurricane. The strongest buildings and the whole of the houses, most of which were of stone, and remarkable for their solidity, gave way to the fury of the wind, and were torn up to their foundation; all the forts destroyed, and many of the heavy cannon carried upwards of a hundred feet from the forts. Had I not been an eye-witness, nothing could have induced me to have believed it. More than *six thousand persons perished*, and all the inhabitants are entirely ruined. Our friend, Sir P. Gibbs, has suffered severely. The hurricane proved fatal to six ships of my squadron, among whom poor Jack Drummond perished on the back of St. Lucia. Several other valuable officers underwent the same fate at Martinique and Dominica. * * * * "—*From the Life of Lord Rodney*, vol. i. page 455.

The late Sir Gilbert Blane's letter.

Extract of a letter from Dr. Blane (afterwards the late Sir Gilbert Blane) to Dr. William Hunter, dated from on board the Sandwich (Sir G. Rodney's flagship), December 22, 1780.

"It began to blow at Barbados on the 9th of October, but it was not apprehended until next day that there would be any thing more than such a gale of wind as they experience, from time to time, in this island at that season. On the evening of the 10th, the wind rose to such a degree of violence as clearly to amount to what is called a hurricane. At 8 P.M., it began to make impression on all the houses, by tearing off the roofs, and overthrowing some of the walls. As the inhabitants had never been accustomed to such a convulsion of nature, they remained for some time in security, but they now began to be in the utmost consternation. * * * * It was thought to be at its greatest height at midnight, and did not abate considerably until eight next morning. During all this time, most of the inhabitants had deserted their houses, to avoid being buried in the ruins; and every age, sex, and condition, were exposed in the fields to the impetuous wind, incessant torrents of rain, and the terrors of thunder and lightning. Many were overwhelmed in the ruins, either by clinging too long in them

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for shelter, or attempting to save what was valuable, or by unavoidable accidents in the fall of walls, roofs, and furniture, the materials of which were projected to great distances. *Even the bodies of men and cattle were lifted from off the ground,* and carried several yards. An estimate has been attempted of the number of deaths, from returns made to the governor, and they amounted to more than 3000, though several parishes had not given in their returns when I was there. * * * All the fruits of the earth, then standing, have been destroyed; most of the trees of the island have been torn up by the roots; and (what will give as strong an idea of the force of the wind as any thing) many of them were stripped of their bark. The sea rose as high as to destroy the fort, carrying the great guns many yards from the platform, and demolishing the houses near the beach. A ship was driven on shore against one of the buildings of the Naval Hospital, which, by this shock, and by the impetuosity of the wind and sea, was entirely destroyed and swept away. * * * * The mole head was swept away; and ridges of coral rock were thrown up, which still remain above the surface of the water: but the harbour and roadstead have upon the whole been improved, having been deepened in some places six feet, in others many fathoms. The crust of coral, which had been the work of ages, having been torn up, leaving a soft oozy bottom, many shells and fish were found ashore which had been heretofore unknown."

The effect of undulations on the bed of the sea.

Log of the Albemarle.

Extract from a Journal of the Proceedings of H. M. S. ALBEMARLE, kept by Captain Thomas Taylor, lying in Carlisle Bay, Barbados.—In *Nautical Time.*

	Hour.	Courses.	Winds.	Remarks.
				Tuesday, October 10, 1780.
In Carlisle Bay.	P.M.	.....	E	P.M. First part, moderate and hazy; middle and latter, strong gales, with hard rain; employed watering.
	A.M.	.....	ENE	A.M. It blowing very hard, employed clearing our hawse; freshened ditto; several ships driving; a brig parted her cables, hoisted out a boat, and sent a midshipman and four men to assist.

Extract from the Log of H. M. S. ALBEMARLE—*continued.*

Hour.	Courses.	Winds.	Remarks.	Log of the Albemarle.
			Wednesday, October 11, 1780.	
P.M. 1	.....	NE by N	P.M. Strong gales of wind, with hard rain at times. At 1, a ship and brig drove athwart our hawse; employed clearing them of us; we found their anchors had hooked our best bower cable. The gale still increasing much harder, and a large sea heaving in from the S W, which broke over Needham's Fort, called the officers together to ask their opinion whether it was best to endeavour to ride it out or go to sea; the officers' opinion was to go to	1 p.m. on Oct. 10, civil time.
2		NNE	sea. At 2, slipped the best bower cable, balanced the mizen, clapped a hawser on the small bower cable for a spring, veered away the cable, *slipped the hawser*. In hoisting the fore-topmast-staysail to wear the ship it split all to pieces; the gale still increasing, got down the top-gallant-mast on deck; got in the spritsail and jib-boom;	Put to sea.
7			got the dead lights in; shut the ports. At 7, found the step of the mizenmast split; cut away the mizen-topmast; the mizen blew loose, and carried away the mizen-yard; got down the cross-jackyard; found the fore and main masts to work very	
10			much. At 10, cut away the fore topmast to save the foremast; lowered down the	
12			foreyard. At 12.30, still blowing very hard; a hurricane, with rain; wind shifting round to the *westward*.	
A.M. 1		Westerly	A.M. At 1, carried away the mainmast close to the quarter-deck; employed clearing away the wreck; at daylight found the people had cut away the sheet cable close by the hatchway, in clearing away the rigging belonging to the mainmast. At 5,	Storm's centre.
5		Southerly	the wind shifted round to the *southward*, still blowing very hard, with constant rain; still lying hull-to with a heavy sea; the ship, labouring very much, shipped a heavy sea, which stove the armchests and hen-coops; threw them overboard; found two 9-pound carriages broke all to pieces, and one 4-pound carriage ditto.	
Noon.			Noon. Still blowing a hurricane, with hard rain.	
			Thursday, October 12, 1780.	
P.M.	.....	SE by S	P.M. Still blowing a hurricane of wind, with constant, heavy rain; still lying hull-to, found the of the rudder loose. At	1 p.m. Oct. 11.
4			4 saw the N W end of Barbados, bearing N E by N, distance 4 or 5 miles; found the wooden ends to work very much. At 4.30, wore ship; wind shifted round to the S E; got the spritsail up for a foresail; heavy	

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Log of the Albemarle.

Extract from the Log of H. M. S. ALBEMARLE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Thursday, October 12, 1780.
P.M. 11			gales of wind, with constant rain. At 11, still sounding, the wind on our quarter.
A.M.			A.M. At 5, more moderate; hove the ship to under a trysail; employed clearing the wreck.
Noon.			Noon. Fresh gales; large sea from the S W; the Island of Barbados, S E by E, distance 6 or 7 leagues.
			Friday, October 13, 1780.
P.M.			P.M. Fresh gales and cloudy, with a heavy sea from the S W; swayed up the foreyard, set the foresail and fore-staysail.
4	.....	S E	At 4, the extremes of Barbados from ESE to S E, distance 6 or 7 leagues. At 9, ditto; fresh breeze and hazy. At 12, ditto weather, with heavy sea.
9			
12			
A.M. 3			A.M. At 3, ditto weather, *with lightning to the westward.* At 5, saw the Island of Martinico, bearing from N W to W by N, distance 7 or 8 leagues. At 8, saw the Island of St. Lucia, S W, distance 7 or 8 leagues; employed getting up a top-gallant-mast for a mizen-topmast; saw two large pieces of a wreck pass us; employed as needful; N E end of St. Lucia, S W by S, distance 3 leagues.
5			
8		S E by S	

Log of the Vengeance, Admiral Hotham.

Extract from the Log of H. M. S. VENGEANCE (kept by James Walton, Master), moored in the Careenage at St. Lucia.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Tuesday, October 10, 1780.
In Careenage, St. Lucia. P.M.	.....	Variable	P.M. Dark, cloudy weather; a mate and forty men employed on the Vigie.
A.M. 6			A.M. At 6, sailed the Blanche and Alcmene; down top-gallant-yards.
			Wednesday, October 11, 1780.
P.M.	.....	Variable	P.M. Strong squalls; shifted the stream anchor on the starboard bow to the N E. At 7.15, the Egmont drove and brought up again. At 7.30, very strong squalls. At 9, the Ajax parted her cables, and went out to sea. At 11, the gale increased very much. At 12, the Egmont slipped, and went out to sea.
7			
9			
11			
12	.....	Variable	

Log of the Vengeance.

Extract from the Log of H. M. S. VENGEANCE—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, October 11, 1780.
A.M. 4	.....	Variable	A.M. At 4, let go the sheet anchor. At 4.30, the Montagu slipped and run out to sea. At 6, struck lower yards and topmasts. At 8.30, the Amazon slipped and run out to sea. Several transports drove on shore and dismasted in the harbour.
6			
8	.....	N E	
			Thursday, October 12, 1780.
P.M.	.....	N E	P.M. Violent squalls, the gale still increasing. At 12.15, parted the small bower, and brought up with the stream and sheet anchors. At 12.30, cut away the mizen, main, and foremast; a small brig parted three cables, and drove ashore under our stern, and stove to pieces. The ship struck very hard abaft, run fourteen guns forward to ease her; employed clearing the wreck; cut away the longboat, cutter, and schooner-tender, which were immediately dashed to pieces; the hurricane still increasing, the ship still striking at times. At 8, rode clear off the rocks; got the guns in their places, and quoined and secured the lower-deck guns and ports; wind veering to the *eastward.* At 9, lightning between the squalls, still blowing excessively hard, with rain. At 10, less wind, with more rain and lightning. At 12, the hurricane abated, with rain.
8	.....	N E by E	
9			
10			
12			
A.M. 4			A.M. At 4, strong gales and squally, with heavy rain. At 5, saw all the small vessels in the harbour on shore, and most of them dismasted. At 8, made the signal of distress with two guns; got the boats over the side, and got the parted cable on board. At 11, carried out the small anchor to steady the ship; lost all the rigging of the masts and yards, one foresail, one fore-topsail, one main-topsail, one main-topmast-staysail, mizen, and mizen-topsail.
5			
8			
11	.....	E S E	
			Friday, October 13, 1780.
P.M.			P.M. Moderate, with rain; warped further to the southward, and brought up with the sheet anchor; veered away and hove up the small bower, bent another cable, and moored as before. At 8, thunder and lightning, and rain.
8			
A.M. 5	.....	E S E	A.M. At 5, saw the Montagu off the harbour, with all her masts and bowsprit gone. At 9, got up the stream anchor; the Montagu brought up; got a schooner and sent boats with hawsers to assist her in warping in.
9			

Wind veering eastward.

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Log of the Vengeance.

Extract from the Log of H. M. S. VENGEANCE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M.	.....	Variable	Saturday, October 14, 1780. P.M. Moderate and fair weather; carpenters fitting the stump of the mainmast for a jurymast; departed this life, John Green, marine; people employed getting up shears for a jury-mainmast.

Log of the Alcmene.

Extract from the Log of H. M. S. ALCMENE—In *Nautical Time.*

	Hour.	Courses.	Winds.	Remarks.
	P.M.			Wednesday, October 11, 1780.
Sailed from St. Lucia.	1	.....	N N E	P.M. Fresh breezes and squally.
	2			At 2, got under weigh, in company with the Blanche; out first-reef topsails.
	3			
	4			
Off Martinique.	5	N W b W ½ W	N ½ E	Martinique, E ½ N, 6 leagues.
	6			
	7			
	8	N W by W	N by E	
	9	N by E		Tacked.
	10	N W	N N E	Wore ship.
	11			
	12	N W by N	N by E	
	A.M.			
	1	N N W		
	2	E ½ N	N by E	
	3			A.M. Hard gales and rain.
	4			
	5			
	6			Handed topsails.
	7	E ½ N	N N E	Up mainsail; lay-to under foresail.
	8			Wore ship.
	9			Reefed mainsail; balanced mizen; struck top-gallant-masts.
	10			Very hard gales and rain; great sea.
	11			Handed mainsail.
	12			
	P.M.			Thursday, October 12, 1780.
	1	up N N W off N W	Variable	P.M. Hard gales and thick weather, with rain.
	2			Laying-to under foresail, and balanced mizen.
	3			Handed foresail; bent and set main, mizen, and fore staysails, ditto.
Parted from the Blanche, which was lost.	4			At 4, reefed and furled foresail; up mizen, and *lost sight of the Blanche, bearing S S E half a mile.*

Log of the Alcmene.

Extract from the Log of H. M. S. ALCMENE—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday, October 12, 1780.
5	up N N W	N W	
6	off N W		
7			The gale increasing; split main-stay-sail; lay hull-to.
8			Blowing very hard; shipped many seas.
9			Two pumps going; lowered the cross-jack-yard on deck.
10	up S W by S	S E	
11	off S by W		
12			Gale still increasing.
A.M.			
1			A.M. Ship labouring hard, shipping much sea; six of the larboard half-ports washed overboard.
2			
3	up S E by S	S W	
4	off E S E		
5	up S E		
6	off E S E		Gale abated.
7	up E S E off E	S by W	Kept one pump going.
8			Little more moderate.
9			
10			Gale abated; saw a ship a-head, which was supposed to be the Blanche.
11			Began to clear up; a great sea running.
12			Passed by several pieces of wreck.
P.M.			Friday, October 13, 1780.
1	up E off E N E	S S E	P.M. Fresh gales and squally; sent down mizen-topmast and yard; at half-past, set mizen-staysail; more moderate; kept more away.
2			
3	N N E	S E	
4			
5			Squally, with rain.
6			
7			Set foresail.
8			Set close-reefed main-topsail.
9			
10	N N E ½ E		Saw Martinique, E by N, 5 leagues; set close-reefed topsails.
11	N by E		
12	N by W		
A.M.			
1			
2			
3			
4			A.M. At 4, up mizen-topmast.
5			At 5, do. weather; out one-reef-topsails.
6			At 6, spoke a brig, the Norfolk, in distress; the Saints, bearing E N E, 6 leagues.
7	N W by N		
8	N W		At 8, gave chase to a snow in the N W.
9	W N W		
10			At 10, boarded ditto, being lately from Bordeaux, and had drove out of Martinique; fired one gun at ditto.
11	up N E by S off N E		At 11, got the prisoners on board, and fired a gun at and brought-to a brig from Ostend for St. Eustatia.

CHAP. VIII.

Log of the Alcmene.

Extract from the Log of H.M.S. ALCMENE—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M. 12	up N E by S off N E	S E	Friday, October 13, 1780. At meridian, in boat; made sail, the prize in company; the south end of Guadaloupe N E by E, 8 leagues. Fresh breezes and hazy.

Log of the Ajax.

Extract from a Journal in H.M.S. AJAX, Captain John Symonds, at anchor in the Careenage, St. Lucia.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, October 11, 1780.
P.M.	Not in the log	N E	P.M. Squally, with rain; sailed hence the Blanche and Alcmene.
Striking in 4½ fathoms, cut and put to sea. 6			At 6, struck top-gallant-masts; strong gales; parted the small bower cable, let go the best bower, veered to half a cable, when the ship struck very heavy on the send of the sea in 4½ fathoms water; hove off by the spring, cast the ship's head to the northward, cut both cables, and pushed to sea.
A.M. 11			A.M. At 11, Gross Islet, E by N, 4 or 5 leagues.
P.M.	.....	N N E	P.M. Squally, with rain; close-reefed topsail and set the foresail; split the fore-topmast-staysail and unbent it; strong gales continue; in both topsails, the ship taking a very heavy plunge; William Doyle was washed out of the head, and was drowned; blows hard, very strong gales; brought-to, under the mainsail; very heavy squalls in gusts, with rain; the sea running very high and broken.
		N by E	
			Thursday, October 12, 1780.
P.M.	.....	Variable during the hurricane	P.M. Very heavy gusts of wind and rain; split the mainsail, which flew to pieces; bent the fore-staysail for a mizen-staysail and set it; balanced the mizen and set it, which blew to pieces; cut the weather part of the mainsail from the yard and got it on deck; bunted the foresail.
8			At 8, blows excessively hard, the sea running very high; violent gusts of wind, which blew away the main-topmast 12 feet above the capstan, with the topsail-yard and top-gallant-mast, and carried away the mainyard in the slings; cut all away to get clear of the wreck.

Log of the Ajax.

Extract from the Log of H. M. S. AJAX—*concluded.*

Hour.	Courses.	Winds.	Remarks.	
			Thursday, October 12, 1780.	
P.M.	.....	Variable during the hurricane	A.M. Heavy gusts of winds with lightning; the mizenmast blew over the side, about nine feet above the poop-deck; cut away the rigging to clear the wreck; shipped a great quantity of water into our scuppers and ports, which employed our pumps until morning; strong gusts and blowing weather, with a lofty and irregular sea; saw a large ship to leeward of us, and two frigates to windward; employed clearing the standing and running-rigging that had been cut; pumps constantly going, with which we but just kept the ship free.	
8			At 8, more moderate; set the main-staysail; less wind; the sea high and confused.	
			Friday, October 13, 1780.	
P.M.			P.M. Squally, with a confused sea; employed clearing the decks of the running-rigging and blocks; got down and saved both the main-yardarms.	
7			At 7, more moderate and showery; kept only one hand-pump going.	
A.M. 2			A.M. At 2, squally, with showers of rain, thunder, and lightning.	
5			At 5, wore ship; employed cutting the head of mizenmast to fit a cap for the jury-mast, and preparing the main topsail-yard for a mainyard; set fore-topsail, employed rigging the jury mizenmast, and main-topmast; got up the jury mizenmast; fresh gales and rain.	
			Saturday, October 14, 1780.	
P.M.	.....	Variable	P.M. Moderate and heavy rains; secured the mizenmast and set a fore-staysail for a mizen; got the main-topsail-yard across for a mainyard; bent the sail and swayed the yard up; bent the main-top-gallant-staysail for a mizen-staysail.	
10			At 10, more moderate; set the fore and mizen-staysail.	
A.M.			A.M. Ditto weather; set the mainsail and got the top-gallant-yard across for a topsail, and set it on.	
6			At 6, saw the land, south end Dominica, S E by E, 10 leagues; Saints, N E by E, 12 leagues; examined the guns, and scaled those that were wet.	Off Dominica.
9			At 9, spoke the Albemarle frigate, who had lost her mainmast, fore and mizen-topmasts, bound for Antigua to refit; employed variously.	Spoke the Albemarle.
12			Noon. Saints, E by N ½ E, 5 leagues; north end Dominica, E ½ S, 7 leagues.	

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Extract from the Log of the H. M. S. EGMONT, Captain Fanshawe; kept by Mr. Robert Hartley, Master.—In *Nautical Time.*

Log of the Egmont, in St. Lucia.

Hour.	Courses.	Winds.	Remarks.
			Tuesday, October 10, 1780.
P.M.	.....	N by S	P.M. Most part unsettled, with frequent squalls of rain; received on board nine casks of flour and eighty bags of bread; caulkers employed as before, and the long-boat watering.
A.M. 10			A.M. At 10, in a squall of wind, parted the stream cable, and dropped the best bower underfoot.
9	.....	Variable	At 9, run a hawser out to the Amazon frigate, and hove-in upon her, and veered away on the small bower, and hove up the best bower; moored the ship with best bower and small bower, a whole cable on the best bower and half a cable on the small bower.
12	.....	Northw	Noon. Got down the top-gallant-yards; squally, with hard rain; sailed hence the Blanche and Alcmene frigates.
			Wednesday, October 11, 1780.
P.M. 1	.....		P.M. Fresh gales and squally, with rain.
2			
3			
4			
5			
6	.....	E N E	
7			At 7, came on a heavy squall of wind and rain, which parted the small bower cable at twenty fathom from the anchor; the ship swung to the best bower, which brought her up; employed clearing the ship for sea.
8			
9	.....	N	
10	.....	N by W	
11.30			At 11.30, cut away the best bower at a whole cable, the hawser that was fast to the Amazon, and the hawser for the spring, and went to sea under our staysail.
12	.....	N E by N	Midnight. Split the main-topmast-staysail, and set the courses.
A.M. 1			
2			
3			A.M. Strong gales, with hard squalls of rain.
4			
5			Split the fore-staysail.
6			Unbent the main-topmast-staysail.
7			Carried away the main-staysail.
8 }	up E ½ N	N by W	Saw the Ajax standing to the eastward.
9 }	off S E ½ E		Wore and lay-to.
10			
11			
12			Noon. St. Lucia, N 19° E, distance 13 leagues.
			Excess of latitude, 7°.
			Departure, 30° W.
			Very heavy gales and squally.

Cut and went to sea.

Log of the Egmont.

Extract from the Log of H. M. S. Egmont—*continued*.

Hour.	Courses.	Winds.	Remarks.
P.M.			Thursday October 2, 1780.
1	.....	NE	P.M. Very strong gales, with hard squalls and rain.
2			
3			Saw a sloop lying-to in the SE quarter; lost overboard the davit.
4			
5			Lying-to, under a main & mizen-staysail.
6			A.M. At 8, the main-topmast and bowsprit went away. At 8.15, the foremast went away by the larboard-side, and carried away the rigging and stopper of the sheet anchor, which we were obliged to cut away; very hard gales and a very heavy sea.
7			
8			
9			
10	.....	From all quarters	
11			
12			Noon. The tiller in the gun-room broke; the wind *from all quarters of the compass*; shipped a great deal of water.
A.M.			
1			
2			At 9.30, the mizenmast went over the larboard-quarter, as did the mainmast; all the people employed clearing the wreck.
3			
4			

This Sketch of the Egmont is from a drawing made the day after the hurricane, in 1780, by an officer of that ship, and preserved in the family of the late Commissioner Fanshawe.

A.M.			Thursday, October 12, 1780.
5	.....	From all quarters	A.M. At 8, got up a jury foremast and set the spritsail-topsail for a foresail.
6			
7			Noon. Wore ship to the N W, the time the mast went away by the wreck; the
8			

CHAP. VIII.

Log of the Montagu.

Extract from the Log of H. M. S. MONTAGU—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 13, 1780.
P.M. 1	E N E	W by N	P.M. Moderate, with rain. At 4, saw the lights from Morne Fortunée bearing E S E.
2			
3	.....	W S W	
4			
5			
6	.....	S S W	
7			
8			
9			
10			
11			
12			
A.M. 1			A.M. Fired one gun as a signal of distress. At 7, came-to with the sheet anchor in twenty fathoms, the outer part of the Vigie, E, distance 1 mile; found H.M.S. Vengeance, Commodore Hotham, lying in the Careenage, dismasted; found our long-boat, with fourteen full-bound water-casks (butts) stove and beat to pieces, which had been watering, &c., H.M.S. La Blanche (per order of the Commodore, on the 10th inst.), and only four of the water-butts recovered again.
2			
3			
4			
5			
6			
7	.....	S E b S	
8			
9			
10			
11			At 11, weighed and made sail.
12			Noon. Light breezes, with rain; *found the current setting to the northward;* stove two water puncheons, full-bound, which were lashed to the arm of the anchor; employed in pumping ship.
			Saturday, October 14, 1780.
P.M. 2	.....	E S E	P.M. Moderate breezes and cloudy, with rain. At 2, came-to with the stream-anchor in 9 fathoms water; Pidgeon Island, N, distance 2 miles. At 4, weighed and made sail. At 6.30, came-to off the Careenage, with the sheet anchor, in 13 fathoms.
6		and	
		Variable	A.M. Received boats and hawsers from the Vengeance; employed warping into the Careenage.

Log of the Amazon.

Extract from a Journal of the Proceedings of H. M. S AMAZON, Captain the Hon. Clement William Finch; Log kept by Lieutenant Edward Pakenham.

Hour.	Courses.	Winds.	Remarks.	
			Monday, October 9, 1780.	
A.M.	Not in log	E	A.M. Anchored here the Blanche and Alcmene frigates.	
			Tuesday, October 10, 1780.	
P.M.			P.M. Fresh gales and squally, with rain; let go the best bower underfoot, with a hawser bent to it from the Egmont, in order to steady her.	
A.M.	.....	E S E	A.M. Received on board provisions, and completed for three months.	
			Wednesday, October 11, 1780.	
P.M. 6 8 9 11			P.M. Ditto gales, with hard squalls; struck top-gallant-masts. At 6, the Egmont parted; ditto gales; she brought up again under our stern. At 8, strong gales and squally. At 9, the Ajax put to sea. At 11, the Egmont cut and put to sea; excessive hard gales, with rain; veered to a whole cable on the small bower.	
A.M. 4	.....	N East[ly]	A.M. At 4, the Montagu parted and put to sea; bent fore, main, and mizen staysails, and made all ready for sea; got the spritsail yard in. At 7.30, finding the gale increase, slipped the small bower and stream cables, and cut the best, and put to sea; split the fore-staysail to pieces.	Cut and slipped, and went to sea.
7.30				
12			Noon. Blowing a hurricane, with a heavy sea.	
			Thursday, October 12, 1780.	
P.M. 2	.....	N E	P.M. A perfect hurricane. At 2, got the fore-top-gallant-mast's yards, &c., lashed amidships on the main-deck; split the staysails to pieces; ditto, lying-to under bare poles. At 7, the ship began to water-log. 7.30, by the violence of the hurricane the ship overset, and lay in that situation the space of six or eight minutes, when the mast went by the board; found the ship to right; cut away the wreck, and began to heave the lee-guns over. About 8, the ship quite righted, with 10 feet water in the hold; kept the chain pumps going, and heaving the guns overboard, clearing the wreck, &c.	Ship overset.
7				
8	.....	N W		
A.M. 2			A.M. At 2, the chain pumps choked, with 7 feet water in the hold; kept the hands baleing; found several dead bodies	

CHAP. VIII.

Log of the Amazon.

Extract from the Log of H. M. S. Amazon—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Thursday, October 12, 1780.
A.M. 4	Not in log		about the decks. At 4, found the wind abate, and gained on the ship.
12	.....	N N W	Noon. Shipped a spare tiller in the cabin, the old being sprung and broke; found we gained considerably on the ship by baleing; every thing in the hold stove to pieces and in disorder; the gale much abated.

Log continued by Captain the Hon. C. W. Finch.

Hour.	Courses.	Winds.	Remarks.
			Friday, October 13, 1780.
P.M. 5	Not in log	E by S	P.M. First part, hard gales with rain, a heavy sea; middle and latter, fresh gales and squally, with rain. At 5, broke the chain of the starboard pump; rigged the fore-top-gallant-mast for a jury-foremast, and set the fore-top-gallant sail on it; got one of the compasses fitted; the wind in the last twenty-four hours had been round the compass. At 6, kept the pumps going, baleing, &c. At 10, the pumps, &c. going.
6			
10			
12			Midnight. Rigged the main-top-gallant-mast for a jury-mainmast, and set the main-top-gallant sail on it; the chain and hand-pumps kept constantly going, baleing &c.
A.M. 6			A.M. At 6, rigged the mizen-top-gallant-mast for a jury-mizenmast. At 8, struck the main-top-gallant-mast, and rigged the spare jib-boom for a jury-mainmast, and set a mizen-topsail upon it; got the spare pump down in the spirit-room and worked it; the carpenters repairing and clearing the chain pumps. At 12, three feet water in the well; the pumps kept going, baleing, &c.
8			
12			
			Saturday, October 14, 1780.
P.M. 4	.....	E by S	P.M. First and middle parts, fresh gales and hazy weather, with rain; latter, moderate and clear weather; employed clearing the ship of the wreck, &c.; rigged the main-top-gallant-mast on the bitts, and set main-top-gallant-sail on it. At 4, saw the land; the pumps kept going, &c. At 6, the body of Martinico, E by S, dist. 7 or 8 leagues. At 8, cleared the well, with
6			
8			

Log of the Amazon.

Extract from the Log of H. M. S. AMAZON—*concluded.*

Hour.	Courses.	Winds.	Remarks.
	Not in log		Saturday, October 14, 1780. the hand-pumps, baleing, &c.; the spare pump choked; set the royals.
A.M. 10	.....	S S E	A.M. At 10, spoke H.M.S. Ajax, with the loss of her mizenmast.
12			Noon. The northward point of Dominica, E by S, and southward point of Guadaloupe, N N E.—Lat. 16° 26′ N.

Captain Finch's narrative.

The following is from the Hon. Captain Finch's Narrative.

"About seven o'clock at night the gale increased to a degree that can be better conceived from the consequences, than from any description I can give. There was an evident necessity of doing something to relieve the ship; but I was unwilling to cut away the lower masts till the last extremity, and accordingly ordered the people to cut away the main-topmast; but, before it could be accomplished, I found it necessary to cut away the mainmast.

"Whilst I was waiting for the men to come down, *a sudden gust* overset the ship; most of the officers, with myself and a number of the ship's company, got upon the side of the ship: the wheel of the quarter-deck was then under water. In this situation I could perceive the ship settling bodily some feet, until the water washed up to the afterpart of the slides of the carronades on the weather side. Notwithstanding that the ship was so far gone, upon the masts, bowsprit, &c., going away, she righted as far as to let us heave the lee quarter-deck guns and carronades overboard, and soon after one of the forecastle guns, and to cut away the sheet anchor; which had so good an effect, that we were enabled to get at the pumps and lee-guns on the main deck. The throwing them overboard was, in our situation, a work of great difficulty; and I could perceive the ship was already going down by the stern. This arduous task was accomplished under the direction of Lieutenant E. Pakenham, whose experience and determined perseverance marked him out as perhaps the only individual to whom (amid such great exertion) a pre-eminence could be given."

CHAP. VIII.

Extract from the Log of H.M.S. ENDYMION, Captain Carteret, and kept by William Price, Master.—In *Nautical Time*.

Log of the Endymion.	Hour.	Courses.	Winds.	Remarks.
				Monday, October 9, 1780.
	P.M. 1	.....	S S W	P.M. Fresh breezes and fair weather; lying-to, setting fore-rigging, forestay and topmast rigging up; H.M. frigates Andromeda and Laurel in company.
	5	.....	E	
	7	.....	Variable	
	12			Midnight. Moderate breezes and fair. Lat. by observation, 14° 44′ N.
Windward of Martinique.	A.M. 2	.....	E by S	
	3	.....	E	
	5	.....	E by N	
	8			A.M. At 8, made the Andromeda and Laurel signals, to keep on head, as far as signals could be observed.
	9			At 9, the Andromeda made the signal for seeing a strange sail; made the signal to chase, and made sail; out reefs; set all sail upon a wind.
	10	.....	E N E	Rove new fore-topmast-staysail-halyards.
	12	.....	NE by E	Noon. Moderate and fair weather. Martinico, W S W, distance 17 leagues.
				Tuesday, October 10, 1780.
	P.M. 1	.....	N E	P.M. Fresh breezes and hazy weather; in chase.
	5			The Laurel being a considerable distance a-head brought the chase to, after firing several shot; found her to be the brig Sarah and Nancy, from Boston, bound to Granada, loaded with lumber.
	6			At 6, in second reefs, and wore ship; hove-to to shift the men out of the prize; manned her and sent her to Barbados.
	10	.....	N E	
	A.M. 1			A.M. Fresh gales and squally; in third reefs.
	8			Martinico, W S W, distance 10 leagues.
	12			Strong gales and squally weather; Andromeda and Laurel in company.
				Wednesday, October 11, 1780.
Andromeda and Laurel in company.	P.M. 1	.....	N E	P.M. Strong gales and hard squalls.
	2			Handed topsails; down top-gallant-yards; struck top-gallant-masts.
	4			At 4, saw the land N E end of Martinico, S W by S, distance 7 leagues.
	5			At 5, set topsails.
	9			Strong gale and *great swell* from the E N E; handed ditto topsails.
	12			Midnight. Strong gale and hard squalls.
	A.M. 3			A.M. At 3, made the signal for the Andromeda and Laurel to lie-by on the larboard tack.

Extract from the Log of H. M. S. ENDYMION—*continued.*

Hour.	Courses.	Winds.	Remarks.	
			Wednesday, October 11, 1780.	Log of the Endymion.
A.M. 8	.....	E N E	At 8, handed topsail; heavy gales and strong squalls; lost sight of the two ships.	Loses sight of Andromeda and Laurel.
9			At 9, handed mainsail under balance-mizen and mizen-topsail.	
12			Noon. Blows strong and violent squalls; north-east end of Martinico, W S W, distance 4 leagues.	
			Thursday, October 12, 1780.	
P.M. 1	.....	E N E	P.M. Strong gale and hard squalls.	
12			Noon. Wore ship to northward; there saw white water to leeward.	
A.M. 2			A.M. At 2, saw land.	
3			At 3, just weathered the Island of Caraval, the north-east end of Martinico, then bore away, and run between Dominica and Martinico. The main, mizenmast, and fore-topmast blown away by the violence of the wind; some time after, the bowsprit; the wreck being so foul of the best bower anchor, obliged us to cut away 25 fathoms of cable; employed clearing the wreck.	Weathered Caraval.*
5	.....	E		
7	.....	E by N	At 7, hove-to under a mizen-topsail.	
12	.....	E S E	Noon. Continues blowing a heavy gale and violent squalls; bearing and distance Martinico, north end, dist. 15 leagues.	
			Friday, October 13, 1780.	
P.M. 1	.....	S W by W	P.M. Strong gales and violent squalls.	Ship keeping up with the storm.
5			Bent the longboat's mainsail to the stump of the mainmast, to keep the ship to the wind; ship labouring very much, shipping very heavy seas; got a stay up to the mizenmast, and set a mizen-staysail, altered for the purpose.	
12	.....	E S E	Midnight. Blowing a strong gale and hard squalls.	
A.M. 4			A.M. Ship rolls very heavy, which occasions her to strain much.	
6			More moderate and settled. (Then follows details of repairing the rigging.)	
12			Noon. Moderate and squally. Martinico, E, distance 34 leagues.	
			Saturday, October 14, 1780.	
P.M. 3	.....	E S E	P.M. Strong gales and thick weather, with rain; standing to the westward.	
9			Constant rain.	
A.M. 9	.....	S E	A.M. Blowing strong and squally; making a mizen-staysail to set on the stump of the mizenmast. Lat. 14° 17′ N, long. 64° 7′ W. Martinico, E by N, distance 60 leagues.	

* Andromeda and Laurel went on shore.

CHAP. VIII.

Log of the Endymion.

Extract from the Log of H. M. S. ENDYMION—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
P.M. 1	.....	E S E	P.M. Strong gales and squally, with hard rain, and a great swell from south-south-east.
5	... ..	S E	Wore ship and hove-to; head to northward; setting the main-staysail; split it to pieces.
12			Midnight. Thick weather, with hard rain.
A.M. 7	.. .	S S E	A.M. Hard squalls and heavy rain.
8			Santa Cruz, north-easterly, distance 67 leagues.
12			Noon. Lat. 14° 32′ N, long. 65° 9′ W.
			Monday, October 16, 1780.
P.M. 2	.. ...	S S E	P.M. Fresh gale and thick weather; a great swell from the south, heavy rain.
8			Blows dreary and squally.
A.M. 5			A.M. Moderate and clear; all hands employed rigging jury-mainmast and mizen-mast; saw several sails standing different ways.
12	.....	S S E	Noon. Santa Cruz, north, 31° E, distance 49 miles. Moderate and cloudy weather. Lat. by observation, 17° 15′ N.
			Tuesday, October 17, 1780.
P.M. 1	.....	S E	P.M. Moderate and cloudy.
5	.....	S by E	All hands getting jury-mast up and bowsprit out.
9	.....	W S W	Squally, with rain from the southward.
A.M. 6			A.M. Saw the land, bearing N N W, distance, 8 or 9 leagues, body of Porto Rico.
12	.....	S S E	Noon. Moderate and fair weather; west end of the Island of Porto Rico, bearing N N W, distance 7 leagues. Lat. by observation, 17° 43′ N.
			Wednesday, October 18, 1780.
P.M. 1	.....	S W by S	P.M. Light breezes and clear.
3	.....	S S W	
9	.....	S W by S	Squally; handed topsails.
12			Midnight. Fresh breezes and cloudy.
A.M. 5	.....	S by W	
7	.....	S	A.M. Fresh breezes.
12	.....	Variable	Noon. The westernmost land in sight, bearing N W by N, distance 9 leagues. A sail in sight ahead. Lat. by observation, 17° 40′ N.

Extract from the Log of H. M. S. ENDYMION—*continued.*

Hour.	Courses.	Winds.	Remarks.	Log of the Endymion.
			Thursday, October 19, 1780.	
P.M. 1	....	S W b W	P.M. Light breezes and clear.	
10	.....	S W	Fired a 9lb. shot at the aforementioned sail; found her to be a French ship from Bordeaux, bound to Port-au-Prince; shifted the officers and men out of the prize, and gave chase to a sail in the eastward	Chases under jury-masts, and takes a ship.
A.M. 2			A.M. Light breezes and cloudy.	
7			Fired a 9lb. shot at the chase, and brought her to; found her to be the Æolus French transport, with jury-masts, being wrecked in the gale of wind, with 150 troops on board; shifted the men and arms out of her, and gave chase to a sail to the north-east. West end of Porto Rico, distance 17 leagues.	
			Friday, October 20, 1780.	
P.M. 1	.....	N W b W	P.M. Light breezes and cloudy weather.	
6	.....	N N E	Came on a black squall northward, which prevented our coming up with the chase, in all appearance a large French ship.	
12			Noon. Fresh breezes and squally. West end of Porto Rico, N W by W, distance 30 leagues. No observation.	
			Saturday, October 21, 1780.	
P.M. 1	.....	N E	P.M. Fresh breezes and squally.	
Midn.	.....	N E by N	Midnight. Fresh breezes and clear.	
Noon			Noon. Light airs and fair; two prizes in company. Island of Mona, N by E, distance 18 leagues. Lat. by observation, 17° 32′ N.	
			Sunday, October 22, 1780.	
P.M.	.....	N E	P.M. Light breezes and clear.	
A.M. 6			A.M. Saw the land bearing N E, dist. 5 or 6 leagues, the Island of Mona.	
12			Noon. Light breezes. Island Saona, N by W, distance 5 leagues.	
			Monday, October 23, 1780.	
12	.....	N E	Noon. Point Salines, Hispaniola, N W, distance 7 or 8 leagues. Fair weather and smooth sea.	
			Tuesday, October 24, 1780.	
12	.....	Easterly	Noon. Lat. by observation, 17° 11′ N. Island Alta Vela, W N W, distance 8 leagues. Moderate breezes.	

CHAP. VIII.

Log of the Endymion.

Extract from the Log of H. M S. ENDYMION—*concluded.*

Hour.	Courses.	Winds.	Remarks.
12	.....	Easterly	Wednesday, October 25, 1780. Noon. Lat. by observation, 17° 7′ N. Saw land bearing N by W, distance 17 or 18 leagues. Moderate weather.
12	.....	Variable	Thursday, October 26, 1780. Noon. Lat. by observation, 17° 32′ N. Isle à Vache, bearing N, distance 10 leagues.
12	.....	Variable	Friday, October 27, 1780. Noon. Cape Donna Maria, bearing N E. Moderate weather. Lat. 17° 57′ N.
12	.....	ENE	Saturday, October 28, 1780. Noon. East end of Jamaica, bearing N W, distance 7 leagues.
P.M.			Sunday, October 29, 1780. P.M. The town of Kingstown, N W, distance 7 miles. Found at Port Royal harbour the following vessels: Hinchenbrook, Resource, Pelican, Princess Royal, Albion, Diamond, Lowestoffe, Pomona, Hector, Ruby, Egmont, Grafton, Bristol, Trident, Ulysses; the seven last dismasted.

Log of the Star.

Extract from the Log of H. M. S. STAR (kept by R. Carmudy, Master), lying in St. John's Harbour, Antigua.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.	.....	E N E	Tuesday, October 10, 1780. P.M. Moderate and cloudy.
P.M. A.M.	.....	ditto	Wednesday, October 11, 1780. P.M. Moderate breezes and cloudy. A.M. Fresh breezes; squally.
P.M. A.M.	.....	ditto	Thursday, October 12, 1780. P.M. Moderate breezes and calm. A.M. Fresh gales, with squalls of rain.

Storm reaches Antigua.

Log of the Star.

Extract from the Log of H. M. S. STAR—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 13, 1780.
P.M.	.....	Easterly	P.M. Fresh gales, with squalls of rain.
A.M.			A.M. More moderate.
			Saturday, October 14, 1780.
P.M.	.....	S E	P.M. Moderate gales, with squalls of rain.
A.M.			A.M. Ditto weather.
			Sunday, October 15, 1780.
P.M.	.....	ditto	P.M. Moderate breezes, with squalls of rain.
A.M.			A.M. Fresh breezes and squally.
			Monday, October 16, 1780.
P.M.	.....	ditto	P.M. Fresh breezes and squally, with rain.
A.M			A.M. Ditto weather.
			Tuesday, October 17, 1780.
P.M.	.....	Variable	P.M. Moderate and cloudy.
A.M.			A.M. Light airs, inclining to calm.

Log of the Salamander.

Extract from the Log of H. M. S. SALAMANDER, by Lieut. G. W. A. Courtenay, lying in the English Harbour, Antigua.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Tuesday, October 10, 1780.
P.M.	.....	E	P.M. Fresh breezes, middle and latter part strong squalls, with rain; Commodore's signal for a lieutenant from ship.
			Wednesday, October 11, 1780.
P.M.	.....	E N E E	Strong squalls and rain. P.M. Struck yards and topmast.
			Thursday, October 12, 1780.
P.M.	.....	E S E	P.M. Ditto weather.
			Friday, October 13, 1780.
P.M. 4	.....	ditto	P.M. Ditto weather. At 4, got the lower yards fore and aft, and the stream-cable on shore, on the larboard quarter.

CHAP. VIII.

Log of the Salamander.

Extract from the Log of H. M. S. SALAMANDER—*concluded*.

Hour.	Courses.	Winds.	Remarks.
P M.	.....	E S E	Saturday, October 14, 1780. P.M. Squally, with rain; people employed scraping the decks.
P.M. A.M.	.....	ditto	Sunday, October 15, 1780. P.M. Ditto weather. A.M. At 8, arrived here H.M.S. Amazon, dismasted, and the Albemarle under jury-mainmast.

Log of the Vigilant.

Extract from the Log of H.M.S. VIGILANT (kept by Mr. T. O'Neil, Master), lying at Antigua.—In *Nautical Time*.

Hour.	Courses.	Winds.	Remarks.
A.M. 1	.....	E N E	October 10, 1780.
P M. 1	.....	N E	P.M. Rigged out & lashed the mainyard, for getting the guns in; caulkers at work.
A.M. 1	.....	N N E	October 11, 1780. A.M. Squally, with showers.
P.M. 1	.....	N	
12	.....	E N E	
A.M. 1	.....	Variable	October 12, 1780.
12	.....	N N E	A.M. Cloudy, lowering wind, the middle and latter parts strong gales; heavy squalls, with abundance of rain.
P.M. 11	.....	N E	
A.M. 1	.....	E N E	October 13, 1780. A.M. Strong gales, with heavy squalls and rain.
P.M. 3			P.M. Fresh gales and squally.
A.M. 1	.....	E	October 14, 1780. A.M. Fresh gales and squally, with showers of rain.
P.M. 1	.....	E N E	
3			P.M. Bent the bower cables.
A.M. 1	.....	E by N	October 15, 1780. A.M. Fresh gales and squally.
P.M. 1			P.M. Arrived here H.M. frigates Amazon and Albemarle; the first lost all her masts, the latter her mainmast and topmast.
A.M. 1	.....	E N E	October 16, 1780. A.M. Fresh gales and squally.

Log of the Venus.

Extract from a Journal of the Proceedings of H. M. S. VENUS, Captain James Douglas, at St. Christophers.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Wednesday, October 11, 1780.
P. M.	.....	ENE	P.M. Light breezes and clear weather; people employed working up junk.
A. M.			A.M. Ditto weather.
4			At 4, weighed and came to sail.
8			At 8, anchored in Old Road, with the small bower anchor in four and a half fathoms water, and veered to half a cable; the northernmost fort N by E, and the southernmost fort SE by E; employed watering ship.
			Thursday, October 12, 1780.
P. M.			P.M. Squally weather, with rain; came down from Basse Terre Road; H. M. sloop Surprise hove-to and hoisted her boat out, and sent her on board of us; and at half-past made sail, and saw her bring-to a ship in the offing.
5			At 5, completed our water; and at 5.30, weighed, and came to sail.
7			At 7, Sandy Point, N W by N ½ N, St. Eustatia, N W, distance 2 or 3 leagues; strong gales and squally; close-reefed the topsails.
9			At 9, the extremes of St. Kitts, from S by E to S E; St. Eustatia from W by S to S W by S, distance 3 or 4 leagues.
12	.....	ENE	Midnight. Tacked ship and handed mizen-topsail.
A. M. 2	.....	NE	A.M. At 2, strong gales, with heavy squalls; at 2.30, bore up.
4			At 4, split the main-topsail; ditto, unbent it; Sandy Point, S E, distance 3 or 4 miles; sent down the top-gallant-yards and masts; got the spritsail-yard and jib-boom in.
8			At 8, strong gales; split the mainsail and unbent it.
9			At 9, split the fore-staysail.
12			Noon. Handed fore-topsail; bent a main-staysail and a fore-staysail for a mizen-staysail; split the main-staysail in setting of it, and hove her to under a mizen-staysail.
	S 56° W		Lat. 17° 8′ N, long. 19′ W.* St. Christophers, N E by E, distance 29 miles.
			Friday, October 13, 1780.
P. M.			P.M. Strong gales and squally weather.
3			At 3, found the bowsprit sprung; carpenters employed in making a fish for it; still lying-to.

* In some of these logs of the year 1780, the longitude appears to be reckoned from the last place of departure.

CHAP. VIII.

Log of the Venus.

Extract from the Log of H. M. S. VENUS—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Friday, October 13, 1780.
A.M.	.....	S by E	A.M. Ditto weather.
P.M.			
6	S 56° W	S by E	At 6, saw two strange sail, one to the windward and the other to the leeward; ditto, hoisted our colours, as did the strange ships; they proved to be H. M. ships Convert and Surprise.
9	.....	S S W	At 9, made the signal for a strange sail; ditto, saw the Convert set her foresail and give chase.
11			At 11, bent another mainsail; at 11.30, saw the Convert bring-to the chase.
12	S 67° W		Noon. Ditto weather; set the foresail; Convert and strange sail in sight. St. Christophers, N by E, distance 21 leagues. Lat. 16° 50′, long. 53′ W.

Log of the Convert.

Extract from the Log of H. M. S. CONVERT (kept by Mr. W. Caspel, Master).—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Saturday, October 14, 1780.
P.M.			
1	up N E off N	E S E	P.M. Hard gales and squally.
2			
3			
4			Wore ship, and brought-to under the fore and mizen-staysails.
5			
6			
7			
8			
9			French snow in company.
10	up S S E off		Venus in sight.
11	S by W	E	
12			
A.M.			
1			
2			
3			
4			A.M. Wore ship, and brought-to under the mizen.
5			
6			Fired a shot at the snow for bearing away; unbent the fore-topsail and bent another.
7	up S off S W		
8			At 9, hoisted out the longboat, and sent an officer and 10 men on board the snow; received 28 prisoners; hoisted the boat in, & set the foresail; fresh gales and squally; prize and Venus in sight; a brig in the N E, and a sloop in the N W; a schooner S W. Lat. 16° 50′.
9			
10			
11			
12			

Log of the Convert.

Extract from the Log of H. M. S. Convert—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
1	NE by E	SE by E	P.M. Fresh gales and squally.
2			
3			
4			Made the private signal to a vessel a-head, which she answered.
5			Made the signal for all cruisers.
6			
7	S by W		Wore ship; spoke the Venus; made the signal to speak the Surprise.
8			Set the main-topsail.
9	S	E S E	
10	S by E	E by S	Venus, Surprise, and prize in company.
11			One strange sail to the windward of us; split the fore-topmast-staysail.
12	S	E S E	Noon. Squally.
A.M.			
1			
2			A.M. Handed the main-topsail; saw several guns and false fires to windward.
3			
4	S by W		Strong gales and squally.
5			
6	up S off SSW		Hove-to under the foresail, mizen, and mizen-staysail.
7			
8	up S W off	SE by E	
9	W S W		
10			
11			
12			Midnight. Ditto weather; lost sight of the prize.
			Virgin Gorda, N, dist. 5 or 6 leagues.
			Monday, October 16, 1780.
P.M.			
1	W by N	[illegible]	P.M. Fresh gales and squally; spoke
2	S W		H.M.S. Venus; found her bowsprit, fore-
[illegible]			mast, and main-topmast carried away.
4			
5			
6	S W by S	SE by S	Virgin Gorda, N by E, distance 5 or 6
7	W S W		leagues.
8	S W by W		
9	E by N		Made the signal, and wore ship.
10			
11			
[illegible]			
A.M.			
1	S W ½ S / S W	S S E	A.M. Ditto weather; wore ship; Venus in company.
2			Up mainsail; wore ship.
3			
4	E S E	S	Squally, with rain; set the mainsail.
5	E ½ S	S by E	
6	E S E	S	Virgin Gorda, N by W, distance 6 or 7 leagues.
7			
8	W N W		Up mainsail; bore down and spoke the Venus.

CHAP. VIII.

Log of the Convert.

Extract from the Log of H. M. S. CONVERT—*concluded*.

Hour.	Courses.	Winds.	Remarks.
A.M.			Monday, October 16, 1780.
9	N W S W	S S E	Virgin Gorda, W N W, distance 5 or 6 leagues.
10	E by N	SE by S	Wore ship; saw a sail in the north-east; wore ship; set the mainsail.
11	E	S S E	Fresh gales and squally.
12			Midnight. Venus in company. Virgin Gorda, N W, distance 6 or 7 leagues. Lat. 18° 14′ N.
P.M.			Tuesday, October 17, 1780.
1	S W by W	S S E	P.M. Fresh gales and cloudy.
2			
3			Spoke a prize belonging to the Bellona.
4			
5			
6	E		East part of Santa Cruz, S by W, 5 or 6 leagues. Wore ship.
7			
8			
9			
10	E by N	S E by E	
11			
12			Noon. Ditto weather.
A.M.			
1	E	S S E	
2	E by S	S by E	
3	E ½ S		A.M. Fresh breezes and cloudy.
4	E by S		
5			Two strange sail in the S E quarter; swayed up top-gallant-masts.
6			
7			Fired three shot at a Dutch ship from St. Eustatia, and hove-to.
8			
9			Out third and second-reef topsails; set the courses; employed setting up the fore-rigging.
10			
11			
12	S E by E	S by W	Midnight. Lat. 18° 17′.

Log of the Ulysses.

Extract from a Journal of the Proceedings of H.M.S. ULYSSES, Captain Thomas Damaresq.—In *Nautical Time*.

Hour.	Courses.	Winds.	Remarks.
			Saturday, October 14, 1780.
P.M.	.....	NE by E	P.M. These 24 hours strong gales and squally, with hard showers of rain; handed fore and main-topsails; set courses.
4	.....	N E	At 4, made the Island Mona, bearing southward, distance 4 leagues; bore away to the S W of them.

Extract from the Log of H. M. S. Ulysses—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Saturday, October 14, 1780.
P.M. 8	.....	E by S	At 8, the south end of Mona, E N E, distance 3 leagues, from which I take my departure.
A.M. 1			A.M. At 1, lost sight of the Pomona.
2		S E	At 2, up foresail and brought-to under mainsail; struck top-gallant-masts, carried away one of the fore and two of the main shrouds, and one of the main-topmast backstays; employed getting up preventers. Island Saona, N 22° W, dist. 22 leagues. Lat. 17°, long. 4° 14′.
			Sunday, October 15, 1780.
P.M.			P M. Ditto, hard gales, with a great sea; lying-to under mainsail.
2	.. ..	N E	At 2, balanced the mizen and set it, and handed the mainsail.
3			At 3, carried the mizenmast over the side; cleared the wreck.
4			At 4, carried away the fore-topmast and topsail-yard over the side; ditto the jib-boom; carried away one of the main-shrouds.
5			At 5, the mainsail blew to pieces from the yard; ditto, cut away the main-topmast, in hopes of saving the mainmast; got the ship before the wind.
8		Variable round the compass	At 8, the mainmast went over the side, stove the boats and the booms, and carried away the barricading on the quarter-deck; the ship brought-to, employed clearing the wreck, it blowing a storm of wind; the foresail and spritsail blew to pieces from the yard; the ship proving very leaky, with four feet water in the hold, and one of the chain-pumps rendered useless.
A.M. 2			A.M. At 2, the wind continued shifting round the compass. Island of Saona, N 33° W, dist. 32 leagues. Lat. 16° 20′, long 4° 35′.
			Monday, October 16, 1780.
P.M.	. .... .	Variable	P.M. These twenty-four hours ditto weather; lowered the foreyard down to get it rigged, the rigging being all beat to pieces; got a new foresail and bent it; took a reef in ditto, finding the ship to open much in her upper works, and the water gaining on us, having three feet water in the hold
A.M. 3	Lying-to, Southward, and S S E		A.M. At 3, lying-to a-hull. At 3.30, got all the upper-deck guns thrown overboard, and all the lumber on deck, when, with the pumps and baling, we began to gain on the water.

CHAP. VIII.

Log of the Ulysses.

Extract from the Log of H. M. S. ULYSSES—*concluded*.

Hour.	Courses.	Winds.	Remarks.
			Monday, October 16, 1780.
P.M. 4	Lying-to, Southward and	Variable	At 4, began to heave the upper-deck guns overboard; ditto, saw a ship in distress in the S E quarter.
8	S S E		At 8, we got the water to three feet in the well. Island Mona, N 11° E, dist. 28 miles. Lat. 17° 49′, long. 4° 13′.
			Tuesday, October 17, 1780.
P.M.			P.M. First part, strong gales and hazy weather; middle, moderate and clear; latter, light airs, inclinable to calms; a great sea.
8			At 8, not able to get the foreyard up, for fear of carrying away the foremast.
11	.....	S S E	At 11, saw a sail in the N N E quarter; swayed the foreyard up, and set foresail; set a top-gallant-sail on the mizenmast; the sail stood towards us; fired two 18-pound carronades; she hauled her wind; saw it was a large ship that had lost her fore and mizen masts; the Island of Zacha, E N E, distance 6 leagues; saw two sail dismasted; light airs, inclinable to calms.

Log of the Pomona.

Extract from the Journal of the Proceedings of H.M.S. POMONA, Captain C. E. Nugent.—In *Nautical Time*.

Hour.	Courses.	Winds.	Remarks.
			Saturday, October 14, 1780.
P.M. A.M. 2			P.M. Strong gales and cloudy, with heavy squalls of wind and rain. A.M. At 2, hove-to under the mizen-staysail; making a great deal of water; scuttled the lower-deck and kept the chain-pump going.
3			At 3, reefed the courses and handed the topsails; made the Island of Mona, bearing S W; the Commodore wore round to stand to the northward; made the signal to speak him; hailed him to know if we should go ahead, and carry a light to lead him through the Mona Passage; and, being answered in the affirmative, loosed the topsails and bore up.
7			At 7, the south end of Mona, S E, distance 7 miles.
			Sunday, October 15, 1780.
P.M.			P.M. Strong gales and heavy rain; still shipping a great deal of water, and keeping

Log of the Pomona.

Extract from the Log of H. M. S. POMONA—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Sunday, October 15, 1780. the chain and hand pumps going; lowered down the fore and main yards.
6			At 6, the main-topmast went overboard, with topsail-yard and part of the maintop; obliged to cut away the mainyard to get clear of the wreck.
7			At 7, the mizenmast went about 15 feet above the deck; employed clearing the wreck; then bore away; the pumps going, with four and a half feet water in the hold; hove overboard four 18-pounders from the quarter-deck.
A.M. 1			A.M. At 1, fore-top-gallant-mast blew away.
3			At 3, the fore-topmast went over the side, with the topsail-yard, &c.
4			At 4, shipped a sea which stove the cutter and long-boat; hove them overboard to clear the ship; the gale abating; employed in securing the foreyard and setting the foresail.
			Monday, October 16, 1780.
P.M.	.....	E	P.M. Light breezes, and a heavy sea and rain; employed about the rigging.
			Tuesday, October 17, 1780.
P.M.	.....	S W	P.M. Ditto weather; employed as before. Lat. 16° 38′.

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON, Rear-Admiral Rowley.—In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Monday, October 16, 1780.
1	S S E	E N E	P.M. Fresh breezes and thick, cloudy weather.
2			
3			
4			
5			
6			
7			
8			Ditto weather, and hazy, with a heavy swell from the N E.
9			
10	S E by S	Variable	
11			
12			Midnight. Ditto weather.
A.M.			
1			
2			
3			

CHAP. VIII.

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON—*continued.*

Hour.	Courses.	Winds.	Remarks.
A.M.			Monday, October 16, 1780.
4	S E by S	Variable	
5			
6			
7			
8			A.M. Strong gales, and thick heavy weather; handed the topsails.
9			Hauled up the courses and handed ditto, and brought-to under a trysail; Trident, Ruby, and Bristol in company.
10			
11	up S S E off S S W		
12			Noon. Heavy gales and cloudy weather; employed at the pumps.
			No observation.
			Lat. 26° 30′ N, long. 71° 30′ W.
			Caucus,* S 6° E, distance 97 leagues.
P.M.			Tuesday, October 17, 1780.
1	.....	Easterly	P.M. Lying-to under a trysail; heavy gales.
2			
3			Ship falling off in the trough of the sea, laboured much, and shipped heavy seas; employed at the pumps; three feet water above the kelson.
4			
5			
6	up S S E off S W by S		
7			
8			
9			Split the trysails to ribands; lay-to under bare poles.
10			
11	.....	E N E	
12			
A.M.			
1			
2			
3			
4	.....	N W	A.M. Wind shifted round, and a confused sea.
5	N N E by N off E N E		
6			
7			
8			
9			
10			Trident and Ruby in sight to the northward.
11			
12			Noon. Saw the Ruby bear up *under her foresail.*
			No observation.
			Lat. 26° 1′, long. 71° 50′.
			Caucus, S 7° W, distance 84 leagues.
P.M.			Wednesday, October 18, 1780.
1, 2, 3, 4	Lying-to		P.M. Strong gales, with heavy squalls; a heavy sea running; employed baling the ship; all the pumps broke; six feet water in the hold.
			Wore and bore up under a reefed foresail; Trident in company.

* Great Caycos.

Log of the Grafton.

Extract from the Log of H. M. S. GRAFTON—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Wednesday, October 18, 1780.
5	E S E	N W b W	Two sail in sight.
6			Out reef of the foresail.
7			
8			More moderate.
9			
10			Got up the fore-topsail-yard, and set the sail.
11	S E by E		
12			Midnight. Ditto weather. A great swell from the north-west.
A.M.			
1			
2			
3			
4			A.M. Ditto weather.
5			Trident made signal for a sail.
6			Swayed up the mainyard, and got up the main-topsail-yard.
7	S E by S		The strange sail made signal of distress, and repeated it with a gun; we made the Trident's signal to come within hail.
8			
9			
10	S by E	N W	
11			At 11, spoke the Hector in great distress, heaving her lower-deck guns overboard; shortened sail to keep her company.
12			Noon. Moderate and cloudy, with a great swell from the N N W. Lat. 22° 32′ N, long. 69° 6′. Turk's Island, S 23° W, distance 68 leagues.

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL.

Hour.	Courses.	Winds.	Remarks.
P.M.			Sunday, October 15, 1780.
1	S by W	E S E	P.M. Fresh breezes and fair weather; the Commodore made the signal for all captains; bore down and answered ditto.
2	Lying-to,		Carpenters repairing the yawl.
3	up S S E off		Made sail.
4	S W		Saw two strange sail in the N W quarter; signalized to the Ruby for ditto with two guns, repeated; two strange sail in the W by N; hoisted a white jack at the mizen, and kept it there ten minutes; hauled down, as no ship answered it; some minutes after the Ruby hoisted a Dutch jack at the ensign-staff, fired two or three guns, and edged down to the Hector; we, perceiving no ship, answered it; we still hauling our wind.
5	S E by S	E N E	
6			
7	S	Variable	
8	S S E	E	

CHAP. VIII.

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
P.M. 9	S E by S	E by N	The Hector S ½ W, distance 4 or 5 miles.
10			Parted company with the Hector.
11			Squally weather.
12			Midnight. The Ruby W, distance 2 or 3 miles.
A.M. 1			
2			
3			
4			
5	S S E	E	A.M. Saw two sail in the NW quarter, appeared to be dismasted ships; bore down and spoke to the Ruby.
6			
7			Wore ship, then bearing N N W, 5 or 6 miles.
8	N by W		The above ships proved to be the Grafton, Admiral Rowley, and Trident; wore ship with ditto.
9	S E by S ½ S	E by N	
10	S S E		
11			
12			Noon. Variously employed; in company with H.M.S. Grafton, Trident, and Ruby. Lat. by observation, 27° 47′.
			Monday, October 16, 1780.
P.M. 1	S E by S	E by N	P.M. Fresh breezes and clear weather.
2			
3			At 3, sprung the main-topmast; employed in getting it down.
4	S S E	E	Ditto weather.
5			
6			
7			Split the jib.
8	S by E ½ E		
9	S E by S	E by N	Light breezes and cloudy.
10			
11			Fresh breezes and squally.
12			Midnight. The Admiral S E by S, 2 miles.
A.M. 1			
2			
3			
4			
5	S S E	E	A.M. Ditto weather.
6			Reefed fore-topsail.
7	S E by S	E by N	
8			Saw a schooner standing to the northward.
9			
10			Fresh breezes and squally.
11			In second reef fore-topsail.
12			Noon. Ditto weather; in second reef foresail.
			No observation.

Log of the Bristol.

Extract from the Log of H. M. S. BRISTOL—*continued.*

Hour.	Courses.	Winds.	Remarks.
P.M.			Tuesday, October 17, 1780.
1	S E by S	E by N	P.M. Fresh breezes in second and third reef in main and fore topsail.
2	up S E off S		Fresh gales.
3			Brought-to the Admiral, S S E, 2 or 3 miles, under mizen-staysail; saw a ship, supposed standing northward; struck the fore and main topmast.
4			
5			
6	.....	E N E	Hard gales and squally; lost sight of the fleet.
7	up E S E		
8	off S by E		
9			
10			
11	.....	N E	Ditto weather.
12			
A.M.			
1			
2			A.M. Heavy gales; split the mizen-staysail and set the balance mizen.
3	up N E		
4	off E S E	N N W	A great swell running from the S E.
5			Ditto winds and weather.
6			
7			
8			
9	up N N E	N W	Ditto weather, employed repairing the mizen-staysail.
10	off E		
11			More moderate; wore ship and made sail.
12	S E by E	N W	Noon. Saw two sail on the larboard bow; brought-to for some minutes, and made sail again; the Ruby in company.
			No observation.
P.M.			Wednesday, October 18, 780.
1	S E by E	N W	P.M Fresh gales; in company with the Ruby.
2			
3			
4			A great swell from the N N W. One mile and a quarter per hour.
5			
6			Got the fore-topsail-yard, and set sail.
7			Some showers of rain; out second reefs of the topsails.
8			
9			Got up the ....
10			
11			Saw a strange sail, bearing N E, quarter of a mile; she made sail at our appearance, and made her escape.
12			
A.M.			
1			
2			
3			
4			A.M. Moderate.
5			
6			In company with the Ruby.
7			Set the mainsail and other small sails.

CHAP. VIII.

Log of the Bristol.

Extract from the Log of H. M. S. Bristol—*concluded.*

Hour.	Courses.	Winds.	Remarks.
P.M			Wednesday, October 18, 1780.
8	S E by E	N W	Made the Ruby's signal to come within hail, which was not noticed; made ditto with Admiral Rowley's, with one gun, and was answered.
9			Ditto weather.
10	.....	W N W	Employed variously.
11			
12	.....	N	Noon. Ditto weather. Lat. observed, 24° 27′ N.

Log of the Hector.

Extract from the Log of H. M. S. Hector.

Hour.	Courses.	Winds.	Remarks.
P.M.			Sunday, October 15, 1780.
6	S by E	E by S	P.M. Fresh gales and cloudy.
7	S by E ½ E	E	
8	S S W	S E	At 8, the Bristol, N E by E.
9	S S E	E	
10			At 10.30, split the main-topsail, unbent it, and bent another.
11			
12			Noon. Moderate and fair.
A.M.			
1			
2			
3			A.M. At 3, fresh breezes and cloudy, W.
4			
5			
6			At 6.30, saw two sail bearing about S by W.
7			
8			At 8, fresh gales and squally; put the ship's company to an allowance of two quarts of water a day per man; coopers employed shaking the empty and stove casks in the hold, to clear away.
9			
10			
11			
12			Lat. observed, 27° 13′ N.
P.M.			Monday, October 16, 1780.
1	S by E	E by S	P.M. The first part, fresh gales, with showers, rain, and sea; split the main-topsail, unbent it, and bent another.
2			
3			
4	S S E		
5			
6			
7			
8			At 8, wore ship to the northward.
9	N by E	E by N	
10			

Log of the Hector.

Extract from the Log of H. M. S. HECTOR—*continued.*

Hour.	Courses.	Winds.	Remarks.
			Monday, October 16, 1780.
P. M. 11			
12			Midnight. Fresh gales and squally, with a heavy sea from the eastward.
A. M. 1	N by W SSE	E	At 1.30, wore ship to the southward; when veering, saw four strange sail in the N E.
2			At 2, set fore and main-topsail.
3			
4			At 4, carried away the clew of the main-topsail, handed ditto.
5			At 5, handed the fore-topsail.
6			
7			At 7, the main-tack gave way; hauled up the weather clew, and rove a new tack; carried away the mizen-gaff. At 7.30, set the main-sail.
8			At 8, the gale increased; hauled up the courses, and close-reefed them.
9			
10			At 10, hauled on board the main-tack; and in hauling on board the fore-tack, the sail split to pieces, and was lost.
11	up N by W off N W by N		At 11, blowing a very strong gale, with a heavy sea running; and the ship labouring very much, and making a great quantity of water, was obliged to throw overboard the remainder of the quarter-deck and forecastle guns to ease the ship.
12			Noon. Wore ship to the northward; hard gales, with chain-pumps constantly working. No observation.
			Tuesday, October 17, 1780.
P. M. 1	up N by W off N W by N	N E by E	P.M. Strong gales and squally, with a heavy sea from the eastward, and rain; the hand pumps frequently working to keep the ship free; the gale increased; the ship labouring and straining very much, threw overboard 11 main-deck guns, in order to ease the ship; got a preventer tack and sheet on the mainsail.
2			
3			
4			
5	up N N W off N W	N E	At 5, the leech-rope of the mizen-stay-sail gave way, and the sail blew all to pieces, likewise the long-boat's mainsail for a mizen; both were entirely lost.
6			
7			
8			At 8, excessive hard gales and heavy squalls, with rain.
9			
10			
11			
12			Midnight. Variable to the N W. Wore ship to the eastward, and scudded under close-reefed mainsail; the ship making great quantities of water; the hand and chain pumps constantly going.

CHAP. VIII.

Log of the Hector.

Extract from the Log of H. M. S. HECTOR—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M.			Tuesday, October 17, 1780.
1	E by N	N W	
2	E N E		
3			
4			Served drams to the ship's company at 4; excessive hard gales, with rain.
5			
6			
7			
8	.....	W	At 8, ditto weather; the hand-pumps and one chain-pump constantly going.
9	E by S		
10			
11	E by S ½ S		
12			Noon. Hard gales and squally, with rain; and a heavy sea running; unbent the remainder of the foresail from the yard. No observation.
P.M.			Wednesday, October 18, 1780.
1	E S E	W N W	P.M. The first part moderating, got up a spritsail and set it for a foresail; we find the ship more leaky, which obliges us to clear away the hold for baling; cooper and assistants employed shaking water-casks; ditto, hove them overboard.
2			
3	E by S		
4			
5			
6	S S E		
7			
8			
9	E S E		
10			
11	S E ½ E		About 11, began to heave the remainder of the main-deck guns overboard, to ease the ship, as the leak increased so fast; ditto, set the mainsail; the leak obliges us to keep our chain and hand-pumps constantly working.
12			
A.M.			
1	S E ½ S		
2	S E by S		
3			
4	S S E	N N W	
5			
6			A.M. At 6, saw two strange sail in the N N W, which we soon discovered to be part of the squadron. N.B. We kept two of the upper-deck guns for signals.
7			
8			
9	S by E		At 9, fired one 18-pounder, and made the signal in distress; employed heaving overboard the lower-deck guns.
10			
11			
12	.....	N	Noon. The Grafton and Trident joined us; we informed the Admiral of our situation, who promised to stay by us, and render us every assistance in his power; unbent the spritsail, and bent a new fore-topsail for a foresail; likewise, let all the reefs out of the mainsail to air; broke two of the winches of the chain-pumps; armourers employed repairing them.

Log of the Trident.

Extract from the Log of H. M. S. TRIDENT.

Hour.	Courses.	Winds.	Remarks.
P.M.			Sunday, October 15, 1780.
1	S ½ E	E by S	P.M. Fresh breezes and cloudy; made the signal to the Admiral for three sail in the S E.
2			
3			
4			Admiral made the signal to call in all cruisers, but the above ships took no notice of it.
5	E S E	N E	
6			
7	S S E ½ E	E by N	
8			
9			
10			Squally, with rain.
11			
12			
A.M.			
1	S E by S		
2			
3			
4			A.M. Moderate and clear.
5			
6			Saw two sail in the S E.
7	S S E ½ E		
8			At 8.30, the Bristol and Ruby joined us.
9			
10			
11			
12			Noon. Fresh breezes and cloudy; split main-topsail; bent another, and repaired it. Lat. 27° 19′ N, long. 10° 57′ E. Turk's Island, S 2° 41′ W, distance 116 leagues.
P.M.			Monday, October 16, 1780.
1	S S E ½ E	E by N	P.M. Fresh breezes and cloudy.
2			
3			
4			Set the rigging up; condemned, per survey, and threw overboard, 376 double pieces of beef, per order of Admiral Rowley, being a nuisance in the ship.
5			
6			
7			Richard Jibb fell overboard and was drowned.
8			
9	S S E	E	
10			
11			
12			Midnight. Ditto weather.
A.M.			
1	S E ¼ S	E N E	
2			
3			A.M. Saw a schooner standing to the northward.
4			
5			
6			

CHAP. VIII.

Log of the Trident.

Extract from the Log of H. M. S. TRIDENT—*continued*.

Hour.	Courses.	Winds.	Remarks.
P.M.			Monday, October 16, 1780.
7	S E ½ S	E N E	Made the signal for a sail in the S E.
8	S E by S	E by N	
9			Handed topsails; reefed the mainsail; sailmakers repairing the foresail.
10			
11			
12			Noon. Hard gales and squally, with rain; brought-to. Lat. 26° 2′ N, long. 11° 12′ E. Turk's Island, S 6° 20′ W, distance 91 leagues.
P.M.			Tuesday, October 17, 1780.
1	up S E by S	E N E	P.M. Strong gales and heavy squalls; handed courses; lowered the lower-yards; got topsail-yards down.
2	off S by E		
3			
4			
5			
6	up S E by E	N E by E	
7	off S E by S		Hard gales and squally, with rain; a heavy sea.
8			
9	up E by S	N E by N	
10	off S E by E		
11			
12			Midnight. Ditto weather.
A.M.			
1	up N E	N N W	
2	off E by N		
3			
4			
5	up N by E	N W b W	
6	off N E		A.M. Two sail in sight; one bearing S by E, the other E by S, 2 or 3 miles
7			Ditto gales and thick, with rain.
8			
9	up N by E		
10	off N E by N		
11			
12			Noon. Ditto weather; saw the Bristol and Ruby put before the wind; Admiral E by S, 2 miles. Lat. 26° 40′ N, long. 11° 24′ E. Turk's Island, S 9° 24′ W, distance 84 leagues.
P.M.			Wednesday October 6, 1780.
1	up N by E / off N E	N W b W	P.M. Strong gales and cloudy. At 1.30, made sail to join the Admiral; got up fore-yard; brought-to.
2	E by S		
3			
4	E by S ½ S	N W	Wore with the Admiral, and made sail; got the main-yard up and topsail-yards across.
5			
6			
7			
8	E S E		Fresh gales and cloudy.
9			

Log of the Trident.

Extract from the Log of H. M. S. TRIDENT—*concluded*.

Hour.	Courses.	Winds.	Remarks.
P.M.			Wednesday, October 18, 1780.
10	E S E	N W	
11			
12	S E by E		Midnight. Fresh gales and cloudy.
A.M.			
1			
2	S E ½ E		
3			
4			A.M. Moderate and clear.
5			
6	.....	N E by N	Admiral made the signal to speak us; bore down to speak him.
7	S E by E		
8	S S E		
9			Hector joined company, having all her masts gone.
10			
11	S by E		
12			Noon. Ditto weather; Admiral S E, quarter of a mile. Lat. 24° 20′ N, long. 12° 38′ E. Turk's Island, S 32° 54′ W, distance 67 leagues.

Log of the Ruby.

Extract from the Log of H. M. S. RUBY.—In *Nautical Time*.

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
P.M.	.....	E by S	P.M. Fresh breezes and cloudy; sent an officer on board the Hector, and supplied her with sixteen barrels of powder, per order of Sir John Hamilton, Bart.
6			At 6, the Hector parted company for Jamaica. At 6.30, saw two sail; made the Hector's signal for seeing two of our squadron in the S W; ditto, answered ditto; the Bristol made the signal for seeing two sail in the N E.
A.M. 5			A.M. At 5, made the Bristol's signal for seeing two of our squadron in the N W, dismasted; wore ship, and stood towards them; the Bristol made the private signal, which was answered.
9	.....	E by N	At 9, joined us; the above ships proved to be the Grafton, Rear-Admiral Rowley, and Trident, under jury-masts; saluted the Admiral with three cheers; answered ditto; split the cross-jack; unbent him, and bent another.
		E N E	Lat. 27° 34′.

CHAP. VIII.

Log of the Ruby.

Extract from the Log of H. M. S. RUBY—*concluded.*

Hour.	Courses.	Winds.	Remarks.
			Monday, October 16, 1780.
P.M.			P.M. Ditto weather; sailmakers finished the mizen and mizen fore-topmast-staysail; bent, and sent ditto.
9		E by N E N E	At 9, carried away the foreyard in the slings; split and lost part of the foresail overboard; split the main-topmast-staysail; got the cross-jack-yard down, and got it up for a foreyard; and ditto sail, for a foresail; got the mizen top-gallant-yard and sail up for a fore-topsail; got the fore-top-gallant-yard and sail up for a cross-jack-yard and sail; employed repairing the foresail and main-topmast-staysail; got down top-gallant-yards upon deck; reefed and handed courses; brough-to under the mizen-staysail; Grafton, Trident, and Bristol in company; a very heavy sea.
			Tuesday, October 17, 1780.
P.M.			P.M. Fresh breezes and cloudy. At 1, saw a strange sail in the S E.
2. 30			At 2.30, split the cross-jack-yard.
A.M. 8	.....	E N E	A.M. At 8, three of squadron in sight, to the S E, &c.
			Wednesday, October 18, 1780.
P.M.	.....	N N W N	P.M. Strong gales and thick squalls, and heavy following sea; Grafton, Trident, and Bristol in sight; carried a light at the foremast head during the night; got up the cross-jack and mainyards, and set the sail; Bristol only in sight. Lat. 24° 19′ N.

Log of the Berwick.

Extract from the Log of H. M. S. BERWICK.
In *Nautical Time.*

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
P.M.			
1	N by W	N E by E	P.M. Fresh breezes and cloudy; the sailmakers employed in altering and making sails for the jury-masts and yards.
2			
3			
4			Squally, with rain.
5	N by W ½ W	N E	Ditto weather; bent the main-topmast-staysail, and paralleled the foreyard.
6			
7	N N W		

Extract from the Log of H. M. S. Berwick—*continued*.

Hour.	Courses.	Winds.	Remarks.
			Sunday, October 15, 1780.
P.M. 8			Fresh breezes, with frequent showers of rain.
9	N by W ½ W	Variable	
10	N ½ W		
11	N		
12	N by E		Midnight. Light breezes and cloudy.
A.M. 1	N		
2	N by W ½ W		
3			
4	N by W	NE by E	A.M. Ditto weather; the sailmakers employed in fitting a jury-main-topsail.
5	N		
6			
7			
8	N by E	E by N	
9			Lat. observed, 34° 20′ N.
10	N N E	E by S	
11	N E by N		Got two of the quarter-deck guns on the forecastle.
12			Noon. Lat. 34° 21′, long 60° 18′. Nantucket Shoals, N 5° W, distance 129 leagues.
			Monday, October 16, 1780.
P.M. 1	N E by N	E by S	P.M. Moderate and clear; sailmakers employed in fitting and repairing sails.
2			
3			
4			Ditto weather.
5			
6			Sailmakers employed as above.
7	N E	E S E	Ditto weather.
8			
9			
10			
11			
12			
A.M. 1			
2	E N E	S S E	
3			A.M. Light airs and cloudy.
4			
5	N E		
6			
7			
8			Sailmakers employed as above.
9	S	Calm	
10	head to N E		
11	ditto, to	Ditto	A *great swell* from the eastward.
12	N N E		Lat. observed 35° 3′ N., long. 68° 42′. Nantucket Shoals, N 10° W, distance 116 leagues.

Log of the Berwick.

On her way to England.

Light airs,

but a great swell.

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Log of the Berwick.

Hurricane overtakes the Berwick.

Extract from the Log of H. M. S. Berwick—*continued*.

Hour.	Courses.	Winds.	Remarks.
P.M.			Tuesday, October 17, 1780.
2	up N by E	Calm	P.M. At 1.45, *was taken a-back*, wore ship and handed topsails; squally, with rain; loosed the topsails.
3	E by N	Northerly	
4	E ½ N		
5			
6			At 6.15, reefed the fore and main-topsails; in setting the main-topsail carried away the yard in the slings; got it down; fresh gales.
7	E by N		At 7.45, got another yard across, and bent the sail.
8			At 8, set ditto; reefed preventer lanyard.
9	E ½ N		Fresh gales.
10			
11	E		
12	E ½ N		
A.M.			
1	E ½ S	N N E	
2			
3			A.M. At 3.30, handed fore-topsail.
4			Ditto weather.
5	E	N by E	
6			
7	E ½ S	N N E	
8	E by S		
9			No observation.
10			People employed about the rigging and sails.
11	E by S ½ S		
12	E ½ S		Noon. Lat. 34° 50′, long. 65° 40′. Bermudas, N 34° E, distance 61 leagues.
			Wednesday, October 18, 1780.
P.M.			
1	E ½ S	N N E	P.M. Fresh gales and cloudy.
2			At 2, hauled the mainsail up and the fore-staysail down.
3			
4			At 4, handed the mainsail. At 4.30, handed foresail and main-topsail: split the main-staysail hove-to under the mizen ditto; very hard gales and squally.
5	E by N		Hard gales and squally.
6	up E by N		
7	off E S E		
8			Ditto weather.
9			
10			
11			
12			Midnight. Strong gales and heavy squalls.
A.M.			
1			
2			
3			
4			A.M. Ditto weather.
5			
6			
7			

Log of the Berwick.

Extract from the Log of H. M. S. Berwick—*concluded.*

Hour.	Courses.	Winds.	Remarks.
A.M.			Wednesday, October 18, 1780.
8	up E by N off E S E	N N E	Strong gales and heavy squalls; rove new fore-tacks and sheets.
9	up E N E		
10	off E by S		
11			Lat. observed, 33° 31′ N, long. 65° 10′.
12			Noon. Ditto weather. Bermudas, S 53° E, distance 31 leagues.
P.M.			Thursday, October 19, 1780.
1	up E N E	N	P.M. Fresh gales, with frequent showers of rain.
2	off E S E		
3			Set the mizen; the sailmakers employed in repairing the main-staysail.
4			
5			Ditto weather; set up the lee, main, and fore-shrouds.
6			Ditto weather.
7			
8			
9	up E N E		
10	off E by S		
11			
12			
A.M.			
1	up N E by E off E		A.M. More moderate.
2			
3			Ditto weather; bent the main-staysail.
4			
5			
6			At 6.30, bore away under a foresail and fore-topsail.
7	S E	N by W	
8			At 8, got the mizen-topsail-yard across.
9			Fresh gales and cloudy; the people employed at the rigging and sails.
10			
11			At 11, set the mainsail and main-topsail; the sailmakers employed in repairing the mizen-staysail.
12			Noon. Ditto weather. Lat. 32° 25′, long. 64° 21′. Bermudas, E, distance 41 leagues.

Solano's Storm, 1780, and the Winds called "Norths."

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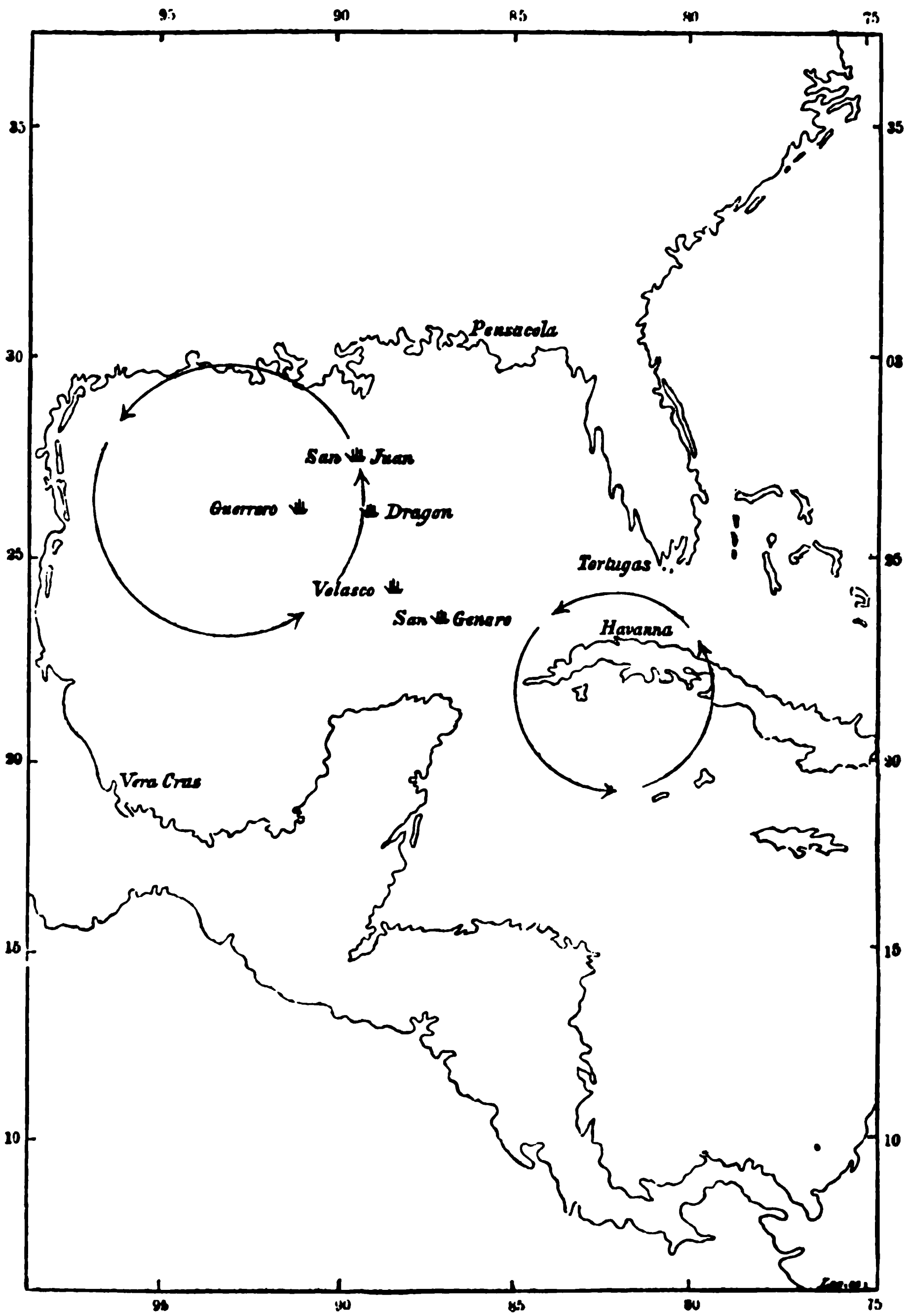
The chart of the great Barbados hurricane has been made, and its course determined by closely following the data procured. In none of the log-books of the same year, which have been examined at the Admiralty, is there any allusion made to other gales, coming from the eastward, and happening at the same time. The course laid down on Chart IX. is therefore, probably, very nearly the true course of that tempest.

I have made this remark, previous to introducing the subject of that storm which dispersed and disabled the Spanish fleet under Solano, destined for the attack of Pensacola, in Florida, first colonized from Europe by the Spaniards. This state was ceded by them to the English in the treaty of 1763. It was still held by England in 1780; but the Spaniards reconquered that part called West Florida, in 1781, the storm having saved it for the English for one year.

This third storm, like that which destroyed Savanna-la-Mar, had been confounded with the great Barbados hurricane, which disabled Rodney's fleet, although it appears to have been a distinct one. It will serve to show, that the gales of the Gulf of Mexico are sometimes, at least, of the same rotatory nature as those which have been described.

It is possible, that the Spaniards may apply the term Nortes, or Norths, to more than one phenomenon; but the violent north winds in the neighbourhood of Vera Cruz, are frequently no other than the left-hand side of rotatory storms, in their northerly


95
90
85
80
75
35
30
25
20
15
10
Pensacola
San Juan
Guerrero
Dragon
Velasco
San Genero
Tortugas
Havanna
Vera Cras

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progression across the Gulf of Mexico; just as Redfield's storms, in their northerly progression, have been clearly shown to be in reality identical with Franklin's north-east storms. What is here meant will be understood by inspecting the preceding figure, which is intended to represent the storm which dispersed this Spanish fleet.

I am indebted to Lord Clarendon, formerly British ambassador at Madrid, for copies of documents, procured by him from the Spanish government, relative to Solano's storm, extracts from which are here printed.

These records show, that the Spanish Admiral's flagship was in the northern half of a circular storm, for the wind commenced at north-east, veered to south-east, and ended at south-south-east. It is possible that this storm may have had its origin near the west end of Cuba, for the weather at this period was moderate, and fine at Jamaica; and we find no trace of it in any of the log-books of Sir P. Parker's squadron. The Phœnix British frigate, just before she was wrecked, had come from Pensacola, and she had looked into Havannah harbour, and seen Solano's fleet lying there.

On the morning of the 15th the wind at Havannah was south-east; on that day, Solano (having first consulted the pilots) called together the captains of the fleet, when it was determined to sail the next day, *provided the wind did not veer from the south-east quarter to south.* Next morning, the 16th of October, the wind being light, and more easterly, the signal was made to weigh, and fifty-eight ships out of seventy-four got out of harbour before night, and they were all out at 9 P.M.

Fuerza de la Escuadra.

		Comandantes.
Navios.....	San Juan (flag-ship).....	Pereda.
	Guerrero.....	Estava.
	Velasco.....	Muñoz Velasco.
	Dragon..... ...	Autran.
	San Ramon.....	Calvo de Irazabal.
	San Genaro.....	Tejada.
	Astulo.....	Velasco.
Fragatas....	Matilde.....	Alderete.
	Rosalia.....	Tacon.
	O. Comandante del Convoy..	Aristizabal.
	Aulia.....	Goicoechea.
Chambequin.	Caiman.....	Roda.
Paquebot....	Pio	Ibregon.
Lugre	Duque de Cornwallis.....	Correa.

Convoy.—Aristizabal.

32 Transportes de Tropos .... { Ejercito al mando del Gen. Galvez.

2 Hospitales.

6 Transportes con Artilleria, viveres, municiones y pertrechos.

11 Goletas con polvore.

9 Mercantes con destino á Nueva Orleans.

Extract from the Journal of the Spanish Admiral Don José Solano, having his flag on board of the San Juan, commanded by Pereda:— Journal of the San Juan, flag-ship.

"*Oct.* 16*th*, 1780. At daybreak, after a moderate land breeze from E. and E.S.E., the scud moving in the same direction, it fell calm. The wind afterwards sprung up again from the E. S. E. quarter, and freshened; and at 6 A.M. the signal was made to heave short. The wind appeared settled in the E.; the signal was made to weigh anchor, and the Caiman ordered to wait to see all the vessels out of port. By half-past nine the Admiral was a league from the land, standing on under topsails only, in order to unite his fleet. In this manner he stood on a northerly course with the same sail during the rest of the day, with the wind varying from E. to N.E. By sunset, the Velasco, San Genaro, and the San Ramon, with seven transports, had not got out of

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port. The Admiral kept the same sail upon his ship during the night.

"*Oct.* 17*th.* At dawn it was calm in shore. By eight o'clock a breeze sprung up from the N.E. Fifty-eight ships and vessels were in sight, out of seventy-four; the Velasco and San Genaro being among the missing ships. At seven o'clock, the Caiman made a signal that all the vessels had got out of the port by nine o'clock the night previous. The Admiral, concluding that the missing ships were either covered by the haze, or that they had got a-head of him during the night, made sail in the course N. 10° W.* By noon the wind freshened at N.E., scud and heavy clouds closing in upon us. The San Juan carrying her foresail and topsails, lowering and raising the latter occasionally, in order to keep the fleet together. At 9 P.M., the breeze freshened; took in the topsails; towards evening, we could only just see the vanguard, owing to the density of the clouds. At 6 P.M., reefed the foresail. By 10 at night, the wind increased, and was then at N.E. ¼ E., with torrents of rain and some hard squalls, shifting as far as E.N.E.

"*Oct.* 18*th.* At daybreak, heavy clouds, rain, wind, and sea. Two ships and a brig of the convoy in sight. At 9 A.M., the wind was E.N.E. At 10 A.M., a ship near us, which we took to be the Guerrero, made a signal that she was leaky. A squall coming on we could make out no more, and we then lost sight of all ships; furled the close-reefed foresail, and lay-to under a mainsail; the ship labouring very much.

"From the 18*th* to the 20*th*, continued lying-to in the fourth quadrant;† the weather still dark and increasing; the wind at N.E.; continued rain, with a heavy sea; kept two pumps constantly working.

"At 10 P.M., on the 20*th*, our tiller broke; secured the rudder; the ship sustaining heavy and repeated squalls, whilst she came up from the E.N.E. as far as E., as the wind veered round from the S.E. to the S.S.E.

"*Oct.* 21*st.* By half-past four in the morning, the wind changing, made the ship come up head to sea. The ship then pitched away all her masts as well as her bowsprit, and with it lost the greater part of the cutwater. By the exertion of the officers and crew the wreck was cleared by six o'clock; at this hour it began to clear up from the S.S.E. Lightened the decks of everything we could. The sea ran so high that we were still unable to ship another tiller.

* In the original, Al rumbo, N. 10.

† Del 4to cuadrante.

"At 11 A.M., set top-gallant-sails on the stumps of the main and fore masts, and the sail of the launch on the stump of the mizen, keeping her head to the N. E. At noon, latitude 26° 42′ N., longitude, 290° 9′ E. of Teneriffe; longitude 86° 11′ W. of Greenwich.

"*Oct. 22nd.* Commenced with less sea and wind. At daylight saw a large vessel; we fired three guns, but she did not answer our signals. Got another tiller shipped; prepared jury-masts and sails, but the ship would not wear, and we could not set them. At noon fell in with the brig Industria, which had received no damage, and we were the only vessel, excepting one, (name unknown) that she had fallen in with since the 17th; she had laid-to all the time. The Industria was ordered to keep along with the Admiral. In the evening spoke the transport St. John the Baptist; she had not suffered much.

"*Oct. 23rd.* At daybreak found ourselves close to the frigate Rosalia, the captain of which came on board. During the first four days of the storm the Rosalia lay-to, but on the fifth she scudded with her spritsail for a foresail. Towards the end of the storm, for eight hours, she was in a complete hurricane; her seams had opened, and she leaked both through the decks and sides. By the assistance of her boats we were enabled to wear the San Juan, after which we got up the jury-rigging.

"The Admiral calling a council, it was determined upon returning to Havannah; orders were therefore given to Captain Pereda (captain of the San Juan) to proceed to that port, and to conduct thither all the ships he should fall in with. The Admiral shifted his flag on board the Rosalia, leaving the San Juan rigging jury-masts, in latitude 27° 20′ N., longitude 291° 9′ E. of Teneriffe; longitude 89° 21′ W. of Greenwich.

"The Spanish Admiral then sailed for Pensacola; and, after cruising in that neighbourhood for some time without finding any of his ships, he left it; and on the 16th of November he reached the Tortuga soundings, which had been ordered as a point of rendezvous; finding no vessels there, he sailed for Havannah, and arrived there on the 19th, and there found his fleet."

It is stated in the journal that Admiral Solano wished to go to sea again; but in this desire he was overruled by the superior officer commanding in the

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island of Cuba. Having called for reports to be made to him by the commanders of ships of war and frigates, giving an account of what each suffered during the storm, I have received extracts from these, made by order of the Spanish Government: but it is better that we should endeavour to trace recent storms than dwell on those of which little more information can now be obtained. I shall, therefore, briefly state what befel some of the other ships whose places are marked in the figures inserted in page 395.

The Guerrero.

The journal of the Guerrero, for the first part of the storm, is nearly the same as the journal of the Admiral's ship; but this ship experienced the severest part of the hurricane with the wind blowing from the north.

On the 20th their latitude was 25° 57′ N., and long. 91° 7′ W. of Greenwich. The wind having then veered into the fourth quadrant (il 4to cuadrante) they made for the Tortugas soundings, where they fell in with the San Juan, Velasco, and other dismasted ships, and the Guerrero returned with them to Havannah.

The Velasco.

During the early part of the gale the Velasco carried away a topsail, her foresail, and fore-topmast staysail. During a part of the storm this ship scudded to the W.N.W., under bare poles, and therefore she probably had the wind from E.S.E. It blew in violent gusts, and during the night of the 18th she lost her main-topmast. At two in the morning, the sea and wind augmenting, the main and mizen masts went. On the 20th the fore-topmast went, and the rudder split diagonally. The storm with the Velasco ended on the 22nd, the wind having veered from

the first to the fourth quadrant. They considered themselves in lat. 24° 1′ N., long. 88° 14′ W. of Greenwich.

The Dragon.

The Dragon carried her foresail throughout, and reached lat. 25° 59′ N., long. 88° 53′ W. of Greenwich.

The San Ramon.

The 18th, the San Ramon, having no ship in sight, and unable to stand her course, scudded to the W. S. W. In one of the most violent squalls this vessel became water-logged; four pumps did not keep the water under, so that they were "inundated" between decks, and the whole crew were put to baleing. This ship, intended to batter the forts of Pensacola, was armed with heavy guns, and eleven of them were thrown overboard to lighten her. She was carried to lat. 24° 10′ N., long. 90° 5′ W. of Greenwich.

The San Genaro.

The San Genaro, losing the fleet on the 19th, scudded under bare poles to the W. S. W.; and during that day lost all three masts, one after the other. The storm with her ended on the 20th; lat. 23° 33′ N., long. 87° 14′ W. of Greenwich.

The Astulo.

The Astulo lost the storm on the 21st, in lat. 26° 46′, long. 89° 30′, having run for some time N. W., under bare poles, and then lay-to.

The Matilde.

The Matilde at first lay-to under her mizen, but afterwards bore up and scudded. The storm with her was most violent on the 19th; at three o'clock she lost her foremast, and soon afterwards her main and mizen masts. The wind veered from E. to E.S.E. and S. E.; and she lost the storm on the 21st, in lat. 26° 29′ N., long. 88° 42′.

Extracts from the journals of other ships have

CHAP. VIII.

been sent from Madrid; but enough is already given to show that the wind veered in this storm as in other West Indian hurricanes. The paper concludes by stating that there were nineteen vessels missing: whether any of them were ever again heard of is not stated.

By referring to the storms of 1837, and examining that one experienced by the Racer, it will be seen that the course of it was very similar to that of the storm met by Solano, just described; and both of them, in all probability, caused a northerly wind to blow on the shores of Mexico.

CHAPTER IX.

ON STORMS IN HIGH LATITUDES.

HAVING traced hurricanes to the fortieth degree of north latitude, with their courses pointing in the direction of the islands of the Azores and the continent of Europe, we are naturally led to consider whether the gales of our own country partake also of a rotatory character; and whether those of the corresponding latitudes in the other hemisphere revolve in the contrary direction. Whilst we pursue this subject, however, following it up as facts may lead us onward, we must not suppose the rotatory storm (though probably the greatest) is the only disturbing cause of the regular atmospheric currents; and we should bear in mind not to carry its application too far.

The further we go from the equator, the more complicated this subject becomes; and gales succeed each other so fast during our stormy season, that it is not easy to identify the particular storm we may wish to study. It has been shown, that the hurricanes which originate within the tropics increase in diameter, and diminish in force, as they proceed towards the poles; and as the meridians approach each other the gales may become huddled together. They may, therefore, frequently neutralize each other, and become irregular. Their force, too, may often fall off, until the strength of the wind on that side of the circle where it blows

CHAP. IX.

from east is unable to reverse the regular westerly atmospheric current, and to convert it into a temporary easterly gale; and this may be a reason why easterly storms are less frequent in both hemispheres in the latitudes within which Great Britain is situated.

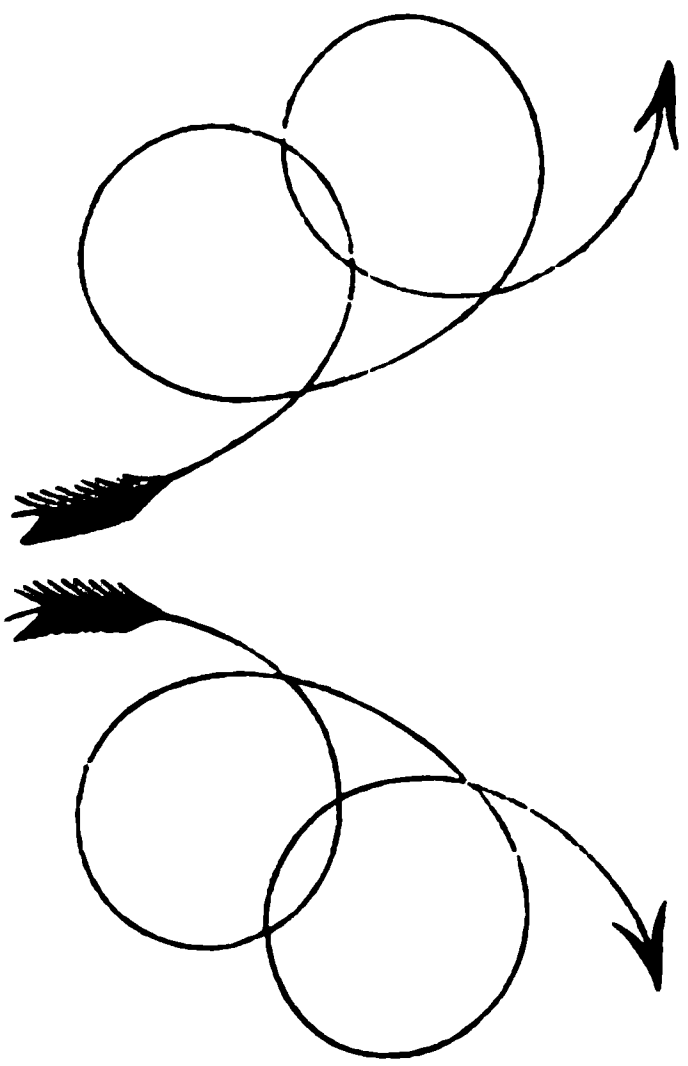
What is here meant will be better understood by turning to the two figures at page 410. These two figures, which are intended to represent the manner in which great storms revolve in both hemispheres, will also serve to show that on the sides of the circles next the poles the wind always blows from the east; and on the sides next the equator from the west.

The wind's force on the polar sides of the figures may be expressed by the rotatory velocity diminished by that of the regular westerly atmospheric current; and if they should be equal a calm would be the consequence; on the contrary, the same atmospheric current would add its force to the westerly and opposite sides of the storms in both hemispheres. Within the tropics, however, the violence of the hurricanes is so great, that the difference here alluded to is not perceptible.

Circles have been used in illustration of the movements of progressive whirlwinds; but the curves described are most likely not circles. It is more probable that they resemble the figures annexed, the degree of curvature altering with the rate of progress of the storms; and this may be another cause why, in high latitudes, westerly winds, in storms, blow harder than easterly. These two figures will serve to explain what is here meant, and the manner in which squalls may, perhaps, revolve in both hemi-

spheres, if, for the sake of illustration, we may suppose them to be continuous.

NORTHERN HEMISPHERE.



SOUTHERN HEMISPHERE.

The Cause of the Barometer falling with a Southerly Wind in the Northern Hemisphere, and with a Northerly Wind in the Southern Hemisphere, explained.

On the south coast of England, violent gales usually set in with the wind about south, or south-south-east, and veer *by the west* towards north-west. The barometer, falling at the commencement, rises as the wind becomes northerly. In the corresponding latitude in the southern hemisphere, this order, as regards both the wind and barometer, is reversed.

Captain King, in his sailing directions for Terra del Fuego, says— Weather.

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"Gales of wind succeed each other at short intervals, and last several days. At times the weather is fine and settled for a fortnight; but those times are few.

Winds.

"Westerly winds prevail during the greater part of the year. The east wind blows chiefly in the winter months, and at times very hard; but it seldom blows in summer.

Easterly winds.

"Winds from the eastern quarter invariably rise light, with fine weather; they increase gradually, the weather changes, and at times end in a determined heavy gale. More frequently they rise to the strength of a treble-reefed topsail breeze, then die away gradually, or shift to another quarter.

North and north-west winds,

"From the north the wind always begins to blow moderately, but with thicker weather and more clouds than from the eastward; and it is generally accompanied by small rain. Increasing in strength, it draws to the westward gradually, and blows hardest between north and north-west, with heavy clouds, thick weather, and much rain.

shift suddenly to south-west.

"When the fury of the *north-wester* is expended, which varies from twelve to fifty hours, or even while it is blowing hard, the wind sometimes *shifts suddenly* into the *south-west* quarter, blowing harder than before. This wind soon drives away the clouds, and in a few hours you have clear weather, but with heavy squalls passing occasionally.

"In the south-west quarter the wind hangs several days (generally speaking), blowing strong; but moderating towards its end, and granting two or three days of fine weather.

"Northerly winds then begin again, generally

during the summer months; but all manner of shifts and changes are experienced from north to south *by the west* during that season, which would hardly deserve the name of summer, were not the days so much longer, and the weather a little warmer. Rain and wind prevail much more during the long than the short days.

Nature of the summer.

"It should be remembered, that bad weather *never comes on suddenly from the eastward;* neither does a *south-west or southerly* gale shift suddenly to the *northward.* South-west and southerly winds rise suddenly and violently; and must be well considered in choosing anchorages, and preparing for shifts of wind at sea.

"The most usual weather in these latitudes is a fresh wind between north-west and south-west, with a cloudy overcast sky.

Common weather.

"Much difference of opinion has prevailed as to the utility of a barometer in these latitudes. I can only say, that during twelve months' constant trial of a barometer and sympiesometer (Adie's) I found their indications of the utmost value. Their variations do not, of course, correspond to those of middle latitudes; but they correspond to those of high northern latitudes in a remarkable manner, *changing south for north* (*east and west remaining the same*)."

Barometer and sympiesometer.

Captain King makes also the following remarks on the same subject:—

"The mercury stands lowest with north-west winds, and highest with south-east. With the wind at north-west, or northerly, the mercury is low: if it falls to 29 inches, or to 28.80, a south-west gale may be expected; *but it does not commence until the column has*

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ceased to descend. It frequently, however, falls without being followed by this change."

Horsburgh, in speaking of the winds of the South Atlantic, about latitude 38° and 39°, says, "Although here the westerly winds prevail during most months of the year, they are often very unsettled, completing a revolution round the horizon, coincident with the course of the sun, every two, three, or four days, with intervening calms, particularly when the wind is in the south-west quarter." * * * * And in a note he says,* "When cloudy weather accompanies these northerly or north-west winds, there is a risk of a *sudden shift* to south-west or south: this happened to H.M.S. Bristol, to the Queen, and to us in the Anna, in January, 1800. We were in latitude 31° S., long. 22° W.: had run 230 miles in the preceding twenty-four hours; and, with steering-sails set, were running at the rate of ten or eleven miles an hour, when, at 9 P.M., in a shower, the wind shifted from the north-west to the south-south-west in an instant, taking us a-back. We lost all the light sails and booms, and the ship's head was thrown round against the north-west sea before the sails were trimmed, which made her plunge bowsprit and forecastle under.

"Off the south coast of Terra Australis the progress of the gales is usually this: the barometer falls to 29.5 inches or lower, and the wind rises from the north-west, with thick weather, commonly with rain; it veers gradually to the west, increasing in strength, and when it veers to the southward of that point the weather begins to clear up; at south-west the gale blows hardest, and the barometer rises; and by the

* East India Sailing Directory, vol. i. p. 67, second edition.

time the wind gets to south or south-south-east it becomes moderate, with fine weather, and the barometer about 30 inches."*

Professor Dove, of Berlin, aware of what is here stated, viz., that storms set in, in the southern hemisphere, from the opposite quarter to that in which they commence in the northern, proposed a theory to explain the cause, in an octavo volume, published in German; a portion of which will be found translated in Nos. 67 and 68 of the "London and Edinburgh Journal of Science." Professor Dove, in support of this fact, quotes reports from various authorities, from which the following are copied:—

"1. I am indebted to the kindness of Captain Wendt, who sailed round the world several times as commander of the Prussian ship Princess Louise, in answer to an inquiry addressed to him, for the following notice:—

"'The wind in the southern hemisphere usually turns from north through west to south and south-east. Its direction consequently is contrary to that of the wind in the northern hemisphere. To the best of my knowledge the fact is nearly as follows: near the Cape of Good Hope in summer the wind is chiefly south-east, but if the wind turns northerly it is then more violent. When the best summer months are at an end, after a calm of short duration, the wind usually blows very moderately from south-east, with an unusually clear sky. The wind is continually increasing, whenever it turns easterly; and if it has turned to the north, clouds and lightning are sure to appear on the western horizon, and in less than half an hour a storm from west-north-west will ensue, and will not cease until, after 24 or 48 hours, it has veered more to the south.

"'Near Cape Horn, both to the east and west, with a north wind there is generally good weather; when it veers to the north-west it soon blows hard; with a west-north-west to south-west it usually blows a storm (which is also frequently the case from west-north-west and north-west). The wind subsides as it becomes southerly. South-south-east fine weather, frequently succeeded by a calm.'

* East India Sailing Directory, vol. i. p. 97, second edition.

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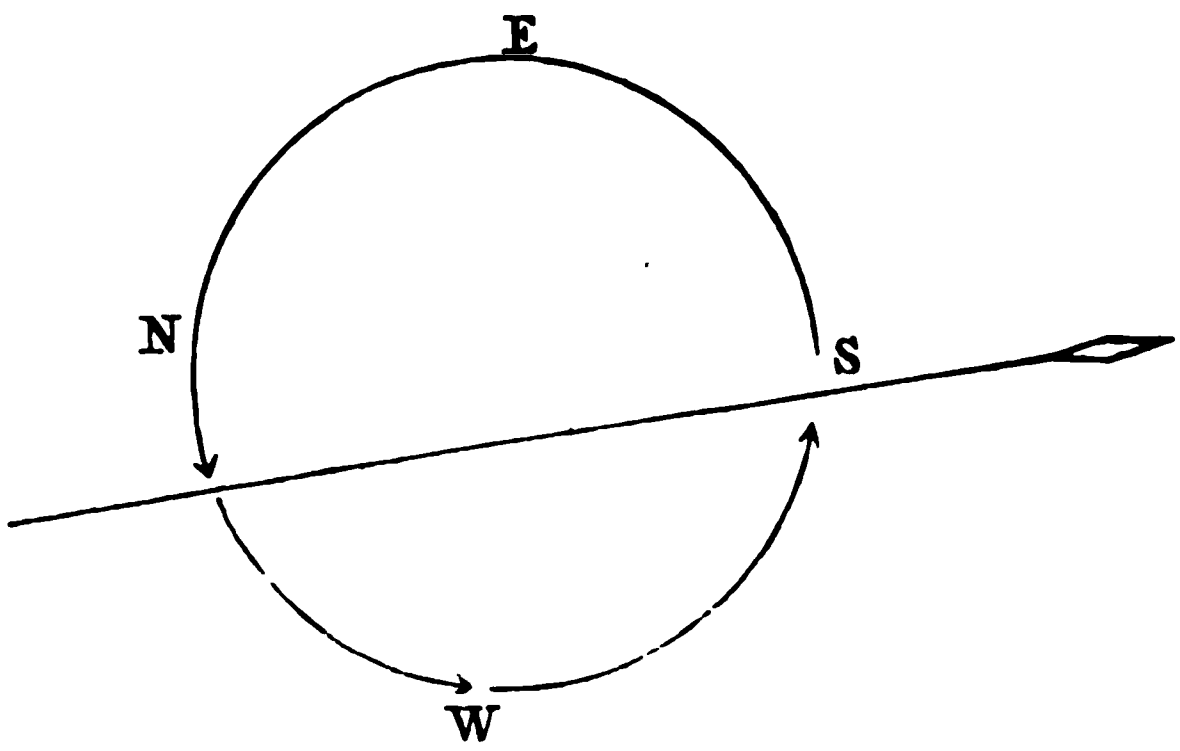
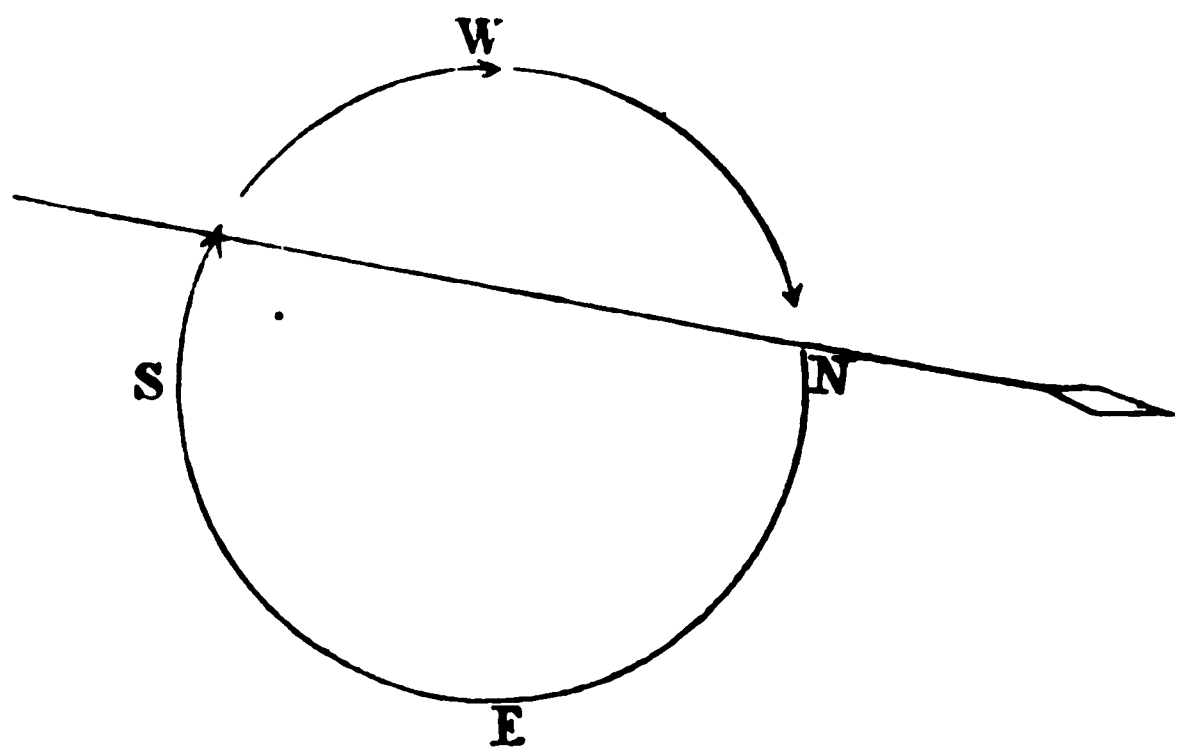
"2. *Æthiopic Sea.*—(Le Gentil.) 'On the 25th and 26th we experienced a kind of gust (*coup de vent*) from north to south-west by west; and I remarked a fact, which you have had opportunity of observing more frequently than myself, that the winds do not follow the same rule in this hemisphere as in the northern hemisphere; physicists have hitherto given no explanation of this phenomenon.'" *

If we project two circles to represent rotatory gales, one for each hemisphere, and draw lines across these circles, which shall be in the direction of the last

NORTHERN HEMISPHERE.





SOUTHERN HEMISPHERE.

* Article entitled Professor Dove's Outlines of a General Theory of the Winds, in "Brewster's Journal of Science," vol. xi. p. 233.

portions of the tracks of the storms traced on Charts VII. and VIII., but in both figures on the side next to the equator, being that on which the wind is always westerly; and if we suppose these two circles to revolve as the storms did which are represented on Charts VII. and VIII., then the lines drawn across these figures will show the veering of the wind in high latitudes of the two hemispheres. They will also explain the reason why the barometer usually begins to fall with a southerly wind in the northern hemisphere; and with a northerly wind in the southern hemisphere. In these figures, the spear-heads mark the courses of the storms, and the sides which first arrive at each place they would pass over.

Wind backing.

In high latitudes the veering is often not completed before the wind backs to near the point from whence the gale had commenced, and in such instances the wind often blows harder than before. A succession of storms, which all revolve in the same way, following closely upon each other, might produce this effect; and something approaching to this consequence may be seen on Chart VII., where two storms nearly meet: but my desire, throughout this investigation, has been to avoid theory or hypothesis, and to confine myself to collecting and arranging facts, and to observing the consequences to which they lead. In an attempt made to procure sufficient information relative to the storms of our own country, I have received the most liberal and ready support from various quarters: the Trinity Board having furnished observations from the lighthouses in all parts of the kingdom, and the Comptroller-General

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of the Coast Guard,* and the officers under him, contributing much useful information; but the whole length of our kingdom, from the Scilly to the Shetland Islands, is not equal to the diameter of the storm traced on Chart VII., and the breadth of Great Britain and Ireland is still less so.

The attempt alluded to was to ascertain the nature of the gales of February, 1838; particularly a storm which was severe, from the south-east quarter, in Ireland and on the west of Scotland. The report received from the Irish lighthouses possesses the great advantage of having the wind's force denoted by numbers: a 0 denoting a calm, and 12 a hurricane; and in the tables, which will be found at the end of this chapter, numbers have been substituted for the expression of the wind's strength in words. The state of the weather is denoted by letters, and an explanation of these will be found at the end of the next chapter.

Where the height of the barometer is wanting in the English and Irish tables, it has been in part supplied from the Coast Guard reports.

By referring to the report from Cape Clear lighthouse (pp. 424, 5), it will be seen that a storm set in there on the 13th of February.

On the 12th the wind's force is marked .. 8,
On the 13th it is marked 11,
On the 14th 12,

and on the 15th its force removed the stone-coping of the lighthouse; but from that time it appears by the report to have begun to diminish.

* Captain Bowles, R.N.

If we compare the reports, we find, on the 14th, the wind's force in Shetland is marked 4, and at the Pentland Firth only 1; at Greenwich it is marked 2, and on the coast of Northumberland a calm. On the 15th the revenue cruiser Swift, at sea, between Cumbray and Rothsay Bay, on the west coast of Scotland, reports the weather calm and cloudy between 11 A.M. and 2 P.M. on that day; and the first indications of the storm were felt by the Swift between 2 and 4 of the same afternoon.

On the 15th the wind also removed the coping-stones from the lighthouse at Maiden Rocks, on the north coast of Ireland, its force being marked 10; but the further to the eastward we examined the wind the less we find its force becomes. At the same date, at Greenwich, though easterly, it is only marked 6; and at Heligoland, on the same day, a strong breeze. By comparing the reports, the gale is found to make a gradual northerly progress; as, for example, at Pentland Skerries, the force on the 15th is marked 1, but on the 16th it is reported 8.

Thus the scope afforded by Great Britain and Ireland being too limited for this inquiry, application was made to Admiral Sir John Ommaney, commanding on the Lisbon station, from whom I have received every assistance he could afford. By the reports from the ships under his command, we find, on the 14th of February, when the storm was blowing violently at Cape Clear lighthouse at *south-east*, that the Camelion was lying-to in a hard gale off Oporto, with the wind at *south-west*. On the 15th the Camelion ran into the harbour of Vigo. By midnight on the 16th there was moderate weather, with the wind west-north-west; and

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next day light southerly breezes. A meteorological report from the flag-ship in the Tagus contains a statement nearly similar, and is annexed.

The Bellerophon and Iberia steamer were at Gibraltar, and the Magicienne in the Bay of Cadiz. At Gibraltar the wind was light on the 7th, and the weather cloudy until seven in the evening, when it set in to blow hard; and on the 12th the Bellerophon was driven on shore. At Cadiz, by the Magicienne's log, the wind blew from south-west and west during this period; but at Gibraltar it was more variable, being south-south-east, south-south-west, and north-west. On the 14th, 15th, and following days, the Magicienne's log reports the weather at Cadiz as being moderate; and, in proof of this, during each of these days that frigate was enabled to loose her sails.

The Iberia steamer left Gibraltar on the 9th, was at Cadiz on the 10th, and came out again the same day: from that time to the 14th, when she entered Lisbon, she was off that coast in heavy gales of wind varying from south-west to west-north-west. This looks as if it were the same storm there; having also a northerly progression.

At the time the Bellerophon was driven on shore at Gibraltar, with the wind at south-west, the Athol troop-ship, in lat. 27° N., long. 36° W., returning from Mauritius, was then about south-west of that place, having at the time light and variable winds, and the day before the Athol was becalmed. As she sailed north the wind freshened, and became west-north-west and north-west, with squalls; but the weather was not bad.

Ship Swan.

By Lloyd's printed reports it appears that a ship,

called the Swan (Errington, Master), sailed from Cork for Jamaica on the 11th, when the wind was easterly both at Cork and at Cape Clear lighthouse; yet this ship returned to Cork on the 19th, in consequence of meeting a gale at south-west and south-south-west, so heavy that she was obliged to throw part of her cargo overboard.

Effect of undulations on the bed of the sea.

I have been informed by Mr. Yarrell that a great many of the Red-band-fish (Cibola rubescens), as well as various tribes of the genus Labrus, which inhabit only the bottom of the sea, and are rarely seen, were cast on shore on the coast of Cornwall during this gale. This was supposed to be occasioned by the effect of the surface undulations being transmitted by degrees to the bottom. A similar effect, but one of a greater degree, is described in the late Sir Gilbert Blane's letter to Dr. Hunter, speaking of the hurricane of 1780, printed at page 347.

What has been here stated is not sufficient to prove satisfactorily that the gale during the middle of February was rotatory, although this south-east storm of Ireland, and of the west of Scotland, does not appear to have come as a storm from the south-east; nor the south-west gales of Gibraltar from the south-west, since the Athol was becalmed in that quarter.

When the first edition of this work was published I had not been able to procure the log-books of the squadron on the north coast of Spain under the orders of Lord John Hay. These vessels, at anchor in the harbour of Passages, at the bottom of the Bay of Biscay, should have had the wind from south, but more moderate than in Ireland. The log-book of the North Star, the Commodore's ship, has now been procured,

CHAP. IX.

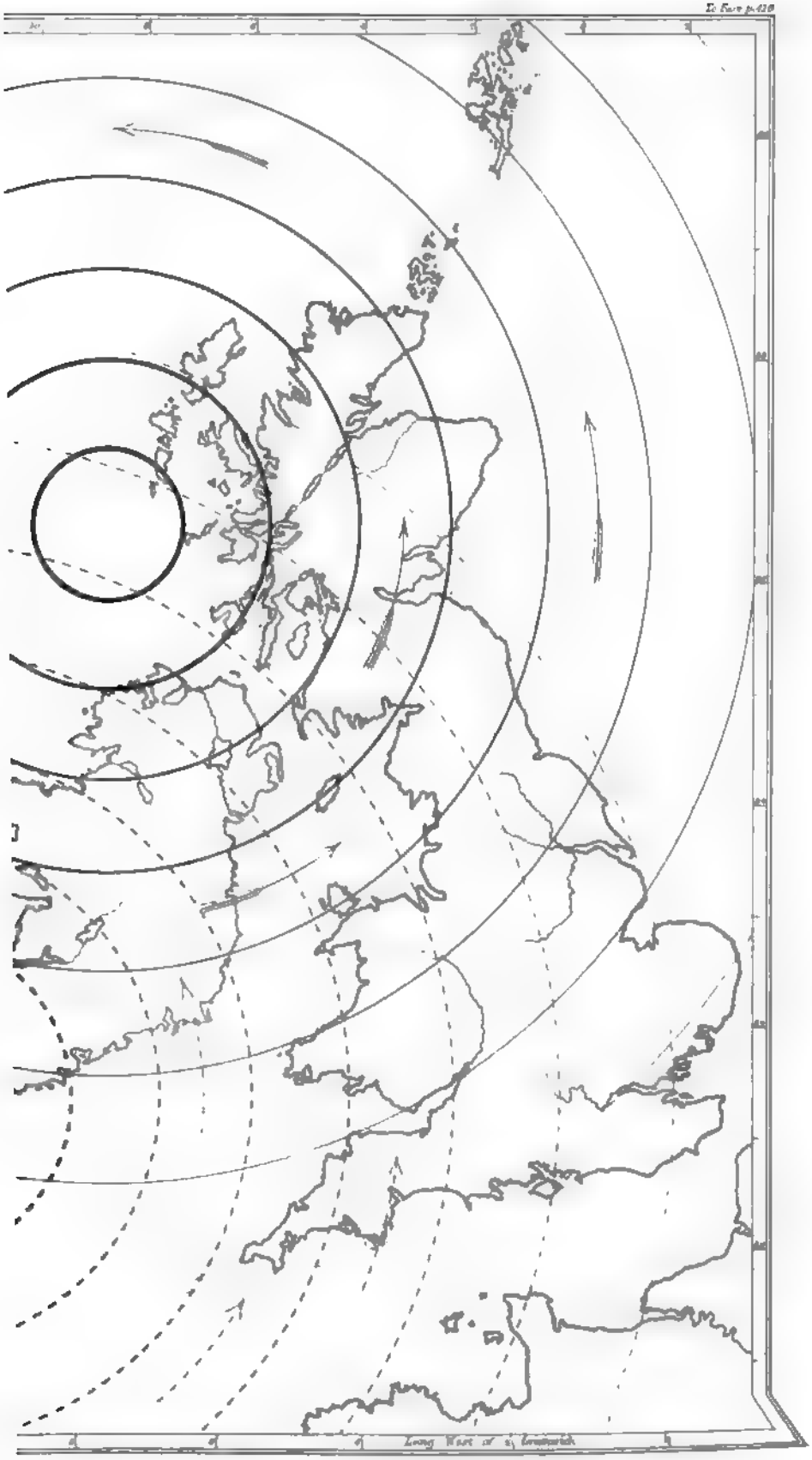
and it proves that the wind changed, and it became south for two days, and then became south-west. The following is an extract from the log-book of the North Star, lying in Passages Harbour:—

" 12th February	. . .	Wind	south;	light winds, and fine.
13th —	. . .	—	south;	moderate, with rain at times.
14th —	. . .	—	S.W.;	moderate and fine.
15th —	. . .	—	S.W.;	A.M. ditto; P.M. fresh breezes and squally.
16th —	. . .	—	S.W.;	fresh breezes and squally.
17th —	. . .	—	S.W.;	moderate, with rain."

The annexed diagram of the British Isles is intended to show what the veering of the wind would be in these islands during a rotatory storm of great diameter, moving in a north-north-east direction, with its centre passing on the westward side of Ireland and the western isles of Scotland. By examining this figure it will be seen that in Ireland such a storm would set in about south-east, that it would veer more and more towards south-west, and end with the wind about west; so that this diagram will serve, almost without alteration, to represent the storm just described, and to explain the veering of the wind in many of the gales which pass over Great Britain and Ireland.

The dotted portions of concentric circles show the way such a storm would set in, whilst those marked by continuous curved lines represent the storm passing off; the right-hand side of it passing over Great Britain. The influence of such a storm might be felt much beyond the limits of the curves as drawn in the diagram. Thus it might change a north-west wind to a south-east one, as far as Heligoland, which happened in February, 1837, as may be seen by turning

To Face p. 410



to the Lighthouse reports of the weather for that period.

When we look at a globe, and examine the true figure of the earth and water, we see how very much the Atlantic narrows between Greenland and Norway. If land in any way influences the course of storms, it is possible the centres of a great number of the Atlantic storms may pass between these two countries. It will be curious to know the truth of this, which is at present little more than mere hypothesis. If correct, north-easterly storms must be the most frequent gales at Labrador and Greenland; but whether these really are the prevailing winds there I am not informed.

In studying the subject, and consulting the figures, it should be borne in mind that the squalls, particularly those of high latitude, in all probability, do not follow curves so regular as the figures represent.

Value of merchants' log-books.

The greatest difficulty in the inquiry is, in getting the logs of merchant ships, which have hitherto been considered of no value after the accounts for the voyages to which they relate are settled. Sometimes they are retained by the masters, at other times by the brokers; and no doubt they are often destroyed.

Proposal for preserving them.

Whilst procuring information I found that a proposal had long since been made, by a Captain in the service of the East India Company,* to preserve the log-books of merchant ships, and to deposit them, when no longer required by the masters or merchants, in some public building, where they might be referred to. If this were done at the principal commercial ports, by agreement amongst the merchants, each port keeping

* Captain Geddes.

its own, and placing the log-books together in a depôt where they might be examined, then the further pursuit of this inquiry would be made comparatively easy; and the log-books of ships in all probability would assume, as meteorological reports, a high degree of importance.

The registers of the weather kept at the lighthouses afford a means of obtaining much information on this subject; and, if different countries would exchange reports, such observations would become of great use. On our own coasts the revenue cruisers have the means of making good reports.

Our numerous colonies, and the islands we possess in various seas, could furnish information from fixed points on shore; and these, combined with the reports contained in the log-books of ships, would afford very great means for determining whether or not the courses which storms pursue are as uniform as they appear to be. Much information respecting the weather is also transmitted, from all parts of the world to which British commerce extends, by the agents and correspondents of Lloyd's Society. But, to render all such information useful for meteorological purposes, it requires to be arranged; and it might be printed periodically.

Of Mr. Luke Howard's work, entitled 'The Climate of London,' two volumes are entirely occupied by recording facts collected during many years. The following passage extracted from it bears directly on the subject of this chapter:—

"*Corresponding Opposite Currents in the Atmosphere.*

"On the 30th October, 1823, at Geneva, it was very warm, the thermometer at 59° F.; but in the following night there was a remarkable change of temperature. A very strong gale came on, with much rain; and, towards morning, snow on the moun-

tains round the lake down to one thousand eight hundred feet elevation. The thermometer fell to 38·5° F.

"On the coast of Bretagne, and in the counties of Wilts, Bucks, Bedford, Oxon, &c., there was in the same night a great storm of wind, with torrents of rain. On the morning of the 31st of October the hills round Salisbury were covered with snow, which near Devizes, &c., was said to be drifted four or five feet deep.

"The remarkable part of this case is, the *opposite directions of the wind* during the storm. At Geneva, on the 29th, 30th, and 31st of October, it is stated to have been constantly south-west. In England it was north-east, or even verging to north; yet the same depressure of temperature obtained in both situations.

"So far M. de Luc, who writes to the editors of the *Bibl. Univ.* for November, 1823. I may add, that having fallen in with a gentleman from Halifax, Nova Scotia, he informed me, that, during the gale above mentioned, the vessel in which he came, being then in the midst of the Atlantic, one thousand miles from Britain, had fine weather, with a strong *westerly* wind, which brought them to Falmouth; *but* attended with so great a swell from north-east as to occasion a remark by the Captain, that he was persuaded there must have been a great storm in that direction. The northerly gale, therefore, spent its fury on the ocean west of Britain; and the neighbouring continent was subjected merely to the counter current from the southward, which yet must have descended from a colder tract of atmosphere above."—Vol. iii. page 127.

Whatever the phenomenon may be which has the power to cause such gyrations, it may originate new disturbances within the expanded limits of storms diminished to a breeze; and this, in high latitudes, may be another reason for the complicated nature of the winds in Great Britain.

When gales diminish to strong breezes, and become no longer dangerous, they cease to be noticed in the shipping reports, and therefore we can trace them no further.

The following Tables relate to the gales of February, 1838.

IRELAND.

Report of the Wind and Weather at the different Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map.	11.				12.				13.				14.				15.			
	Wind.			Barometer.	Wind			Barometer.	Wind.			Barometer.	Wind.			Barometer.	Wind.			Barometer.
	Quarter	Force.	Weather.		Quarter.	Force.	Weather.		Quarter.	Force.	Weather.		Quarter.	Force.	Weather.		Quarter.	Force.	Weather.	
Cape Clear	SE	5	v.		SE	8	q.s.		ESE	11	h.		SE	12	h.		SSE	11	o.g.	
Cork	NE	5	v.	29.70	NE	7	d.gs.	29.66	SE	9	s.	29.53	SE	10	d.s.	29.60	SE	12	s.	29.15
Galway Bay	NE	5	v.		E	6	..		E	8	s.		E	10	s.		E	10	s.	
Wicklow Head	N	5	..		SE	6	s.		SE	9	..		SE	10	..		SE	11	s.	
Eagle Island (Coast of Mayo.)	NNE	6	q.s.		NE	7	v.		SE	7	s.		SE	9	s.		SE	10	s	
Tory Island (Coast of Donegal.)	N	6	s.		SE	4	s.		SE	6	v.		SE	7	v.		ESE	9	..	
Maiden Rocks (Coast of Antrim.)	SE	5	s.		SE	4	c.		SE	5	c.		S	5	c.		SE	6	c.	
Innishowen Head	Var.	5	s.		..	5	v.		SSE	6	g.		SE	8	g.		SE	11	o.g.	
Innistrahul Northernmost lighthouse of Ireland	NE	6	.		N	5	..		NE	5	g.		SE	9	..		SSE	10	..	

IRELAND—*continued.*

Report of the Wind and Weather at the different Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map	16.				17.				18.				19.				20.			
	Wind.				Wind				Wind				Wind.				Wind.			
	Quarter	Force.	Weather.	Barometer	Quarter	Force.	Weather	Barometer.	Quarter.	Force	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.
Cape Clear	N W	7	v.		S S E	8	f.r.		S by E	9	f.r.		E S E	8	f.r.		S E	8	f.	
Cork	S E	12	d	29.20	Var.	7	v.	29.55	Var.	5	v.	30.12	Var.	6	..	29.90	S E	6	v.	29.58
Galway Bay	E	11	f.s.		E	3	..		Var.	5	r.		S	7	c		E	5	v.	
Wicklow Head	S E	11	s.		N W	5	v.		S E	5	v.		S E	7	v.		S	6	v.	
Eagle Island (Coast of Mayo.)	E S E	10	s.		N W	5	v.		S	5	r.		S E	8	c.		S E	8	c.	
Tory Island (Coast of Donegal.)	S E	12	s		S E	5	c.		Var.	5	v.		S	7	c.		S E	5	v.	
Maiden Rocks (Coast of Antrim.)	S E	10	s.		S E	9	s.		S	8	s.		S E	6	c.		S E	5	c.	
Innishowen Head	S E	11	s.		S E	6	o.c.		S	6	r.		S	6	v.		S S E	5	v.	
Innistrahul (Northernmost lighthouse of Ireland.)	S S E	11	o.		S S E	9	..		S	5	v.		S	7	r.		E S E	5	v.	

SCOTLAND.

Report of the Wind and Weather at the Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map.	11.				12.				13.				14.				15.			
	Wind				Wind.				Wind.				Wind.				Wind.			
	Quarter	Force	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.
Inchkeith (Firth of Forth)	N W	2	v.	29.26	N W	2	h.	29.41	N W	1	h.	29.62	Var.	1	h.	29.59	E	1	h.	29.64
Bell Rock (off the Tay)	N N W	4	v.	29.30	N N W	4	v.	29.52	N W	4	v.	29.62	N N W	5	v.	29.70	E	6	v.	29.74
Kinnaird Head..... ..	N	6	s.	29.25	N	6	s.	29.44	N W	6	v.	29.43	N W	2	v.	29.68	Var.	2	v.	29.71
Pentland Skerries	N N W	3	s.	29.28	N	3	s.	29.50	N	3	s.	29.41	S W	1	v.	29.65	N E	1	v.	29.68
Sumburgh (Shetland)	N	6	s.	29.00	N	6	s.	29.24	N	4	s.	29.20	N	4	s.	29.40	N E	4	v.	29.50
Island Glass	N	3	s.	29.40	N E	2	v.	22.50	Var.	1	v.	29.50	E N E	3	v.	29.54	S E	7	v.	29.65
Rhins of Islay	N	3	v.	29.32	N E	1	v.	29.44	E	3	v.	29.42	S E	8	h.	29.54	E	8	h.	29.52
Mull of Galloway	N W	3	v.	29.14	N	3	v.	29.26	S E	3	v.	29.22	S E	5	h.	29.38	S E	6	h.	29.29
Calf of Man	N	3	v.s.	29.13	N E	2	v.	29.22	E	3	h.	29.20	S E	5	v.h.	29.30	S E	7	h.	29.16

I am not aware whether the barometers used in the Lighthouses of Scotland have been compared with a standard barometer or not.

SCOTLAND—*continued.*

Report of the Wind and Weather at the Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map.	16.				17.				18.				19.				20.			
	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.
	Quarter.	Force.			Quarter.	Force.			Quarter.	Force.			Quarter.	Force.			Quarter.	Force.		
Inchkeith (Firth of Forth) ...	S E	6	s.	29.54	S E	6	v.	29.59	S	5	h.	29.93	Var.	1	h.	29.96	Var.	1	h.	29.56
Bell Rock (off the Tay)	S E	6	v.	29.69	S S E	6	h.	29.77	S S E	6	h.	30.07	S S W	6	h.	30.08	Var.	2	h.	29.66
Kinnaird Head	S E	6	v.	29.78	S E	6	v.	29.83	S	6	v.	30.09	S	6	s.	30.02	S W	2	s.	29.65
Pentland Skerries	E	8	v.	29.80	S E	6	h.	29.82	S	8	h.	29.74	S	8	r.	29.60	Var.	3	h.	29.54
Sumburgh (Shetland)	S E	4	v.	29.66	S E	4	v.	29.80	S S E	4	v.	29.90	S	9	h.	29.82	S W	4	f.	29.30
Island Glass	S E	5	v.	29.55	S E	5	v.	29.55	S	7	s.	29.80	Var.	1	v.	29.70	E	2	v.	29.50
Rhins of Islay	S E	8	h.	29.30	E	8	h.	29.56	S E	3	r.	29.85	S	8	r.	29.73	S E	3	v.	29.50
Mull of Galloway	S E	8	h.	29.16	S E	8	h.s.	29.15	S E	3	h.	29.66	S E	3	s.	29.68	S E	3	h.	29.30
Calf of Man	S E	9	h.	29.04	S W	9	s h.	29.00	S E	3	c h.	29.66	S S E	3	h.	29.64	E	3	h.	29.34

ENGLAND.

Report of the Wind and Weather at the Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map.	11.				12.				13.				14.				15.			
	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.	Wind.		Weather.	Barometer.
	Quarter.	Force.			Quarter.	Force.			Quarter.	Force.			Quarter.	Force.			Quarter.	Force.		
Greenwich Observatory	N	4	b.c.	29.35	Var.	1	b.m.	29.56	N E	2	b.	29.51	N E	2	b.	29.73	E	6	q o.	29 60
Heligoland.....	E N E	..	..		N W	6	..		N W	6	..		NNW	..	..		N W	..	f	
Fern (Northumberland)..	N W	7	..		N W	4	..		N W	4	..		O	0	..		E	4	..	
Spurn (Yorkshire)	N b W	7	..		N	4	..		N	4	..		Var.	4	..		S E	5	..	
Sunk (Essex)	N E	5	q.s.		N b W	4	h.		N E	3	c.		N E	4	..		S E	5	c.	
Portland.....	N N W	..	h.		E	..	s.		E N E	..	h.		S E	9	o.		E	9	o.s.	
Falmouth	N E	6	s.		S	4	s.		S E	6	s.		S E	8	..		S E	8	r.	
Scilly Island . . .	N E	6	s.		S	5	c.		S E	6	c.		S E	8	..		S E	10	s.	
Caldy (Bristol Channel) .	N E	1	s.		N E	.	.		E	5	..		E	6	..		E	6	..	

ENGLAND—*continued.*

Report of the Wind and Weather at the Lighthouses during part of February, 1838.

Names of Lighthouses, marked by Numbers on the Map.	16.				17.				18.				19.				20.			
	Wind				Wind.				Wind.				Wind.				Wind.			
	Quarter.	Force	Weather	Barometer.	Quarter.	Force.	Weather.	Barometer	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force.	Weather.	Barometer.	Quarter.	Force	Weather	Barometer.
Greenwich Observatory	E	6	q.b c m.	29.57	W	4	o.s.	29.46	N	2	o.	30.5	E	2	o.	30.16	SE	2	b.c.	29.64
Heligoland	E by S	6	..		SE	6	..		SE b E	6	..		E S E	..	..		SE b E	7	..	
Fern (Northumberland)	E S E	8	..		E S E	8	..		S E	7	..		S	7	..		O	0	..	
Spurn (Yorkshire)	S E	6	..		E S E	9	..		S S E	5	..		S E	9	..		S	4	..	
Sunk (Essex)	S E	6	c.		E by S	6	q.s.		N E	4	h.c.		E S E	5	h.		E S E	4	c.	
Portland	S E	..	o.s.		W	..	h.		E	..	h.		S E	..	c.h		S	..	f.	
Falmouth	S S W	6	r.		N W	4	.		S	4	..		S E	4	.		S E	4	..	
Scilly Island	S S W	6	r.		N W	5	..		S	1	c.		S E	5	h.		W	5	r.	
Caldy (Bristol Channel)	S E	8	..		W	2	r.		W	2	b.		S E	6	h.		S E	6	h.	

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LISBON.

Her Majesty's Ship Donegal's Meteorological Journal, in the River Tagus, Feb. 1838.

Day.	Thermometer.			Barometer.			Winds.	Remarks.
	8 A.M.	1 P.M.	8 P.M.	8 A.M.	1 P.M.	8 P.M.		
1	59	59	58	27.73	29.80	29 73	Variable	Light airs and cloudy.
2	60	59	60	29.92	29.92	29.93	Variable	Light airs and hazy.
3	57	62	60	29.92	29 89	29.80	Easterly	Light breezes and fine.
4	58	56	58	29.70	29.68	29.58	Variable	Light airs and fine.
5	59	57	59	29.50	29.50	29.50	N Easty	Ditto.
6	57	56	58	29.50	29.57	29.60	S W	Light winds & fine weather.
7	60	56	56	29.50	29.56	29.64	W S W	A.M. Squally, with rain. P.M. Moderate and fine.
8	62	63	61	29.54	29.50	29.46	W S W	Moderate breezes, with rain at times.
9	58	59	60	29.47	29.42	29.32	S Westy	A.M. Moderate & cloudy. P.M. Squally, with rain.
10	59	61	59	29.35	29.33	29.44	S W to W	Strong breezes and cloudy.
11	57	58	59	29.26	29.42	29.47	W to S S E	Bar. at 4 A.M. 29.20. At 4.30, blowing a gale, with heavy rain. P.M. Moderate with rain.
12	57	58	58	29.20	29.13	29.03	W	Bar. at 4, 28.96. A.M. Strong breezes and cloudy with rain. P.M. Strong gales, with squalls and rain.
13	56	60	60	29.18	29.23	29.32	W	Strong winds and squally.
14	58	59	58	29 30	29 25	29.30	W	Fresh gales, with rain.
15	56	59	59	29.40	29.44	29.46	W S W	Strong breezes and squally.
16	60	59	59	29 50	29.56	29.61	Westerly	Fresh breezes and fine.
17	61	61	62	29.75	29.76	29 78	Easterly	Light airs and fine.
18	60	59	60	29.66	29.60	29.54	E S E to S W	Light winds and cloudy.
19	62	60	60	29.51	29.52	29.52	Westerly	Light breezes and fine.
20	60	62	61	29.50	29.52	29.56	N Westy	Ditto.
21	57	60	60	29.70	29.61	29.55	S W	Moderate and fine.
22	61	59	60	29.55	29.60	29.65	S Westy	Light breezes and fine.
23	[illegible]	59	57	29.47	29.23	29.10	S W	A.M. Moderate and cloudy. P.M. Heavy gales, with rain.
24	54	56	57	29.20	29.31	29.21	W S W	A.M. Heavy gales, with a continuation of heavy squalls of wind and rain. P.M. Ditto weather.
25	54	56	53	29.03	29.03	29.10	N W to W	Fresh gales, with heavy squalls from W N W.
26	55	56	56	29.20	29.26	29.41	N W	Squally, with heavy rain.
27	57	56	57	29.41	29.41	29.44	W by S	Squally, with rain.
28	55	57	56	29.34	29.36	29.36	W S W	A.M. Heavy squalls of wind, rain, thunder, and lightning.

It is upon the European side of the Atlantic that attention should now principally be directed, in order to ascertain the usual course of storms. That which follows is printed with a view to induce inquiry into the gales of Europe.

Storm in Scotland.

On the 11th of October, 1838, a very violent storm, which was called a hurricane, passed over Scotland; and it is remarkable, inasmuch as its progress was towards the southward of east, and consequently coming from the northward of west: the progression appeared to be gradual. There was nothing unusual in the weather in the south of England on the 11th and 12th of October; but early on the 13th the wind at Portsmouth set in with squalls, commencing at north-west, veering towards north,—an unusual circumstance, which led me to believe that a gale to the northward of us might be passing on a south-easterly course; and the snow which fell at intervals, during the squalls in the afternoon, strengthened this opinion, which subsequent accounts confirmed.

Cause for changes of temperature, and

It will be a very curious and interesting part of this inquiry to ascertain hereafter, if the nature of storms should become better understood, whether the great alterations in the temperature of the air, particularly in the winter season, be not frequently caused by the rotation of a great extent of the atmosphere. Thus, for example, circular storms of a thousand miles diameter, as they approach Great Britain, would bring to us part of the atmosphere of the Azores; and may, perhaps, cause us to have the thermometer in the early part of December standing as high as 50°, which often occurs. On the contrary, if we suppose a storm coming to Great Britain from the direction of Labrador, with a

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progression somewhat southerly, we may conceive a very sudden alteration in the temperature likely to take place, and that in our winter months it would cover the country with snow.

Early fall of snow.

The progression of this gale, which passed over Scotland on the 11th of October, 1838, coming from the northward of west, and moving somewhat to the southward of east, seems to have been the cause of snow falling so early in the year as the 13th of October in the south of England.

Effect of storms on chain-bridges.

The chain-bridge at Montrose was broken by this storm. This bridge was visited soon afterwards by Colonel Pasley, of the Royal Engineers, who made the following remarks upon the subject:—

Montrose Bridge.

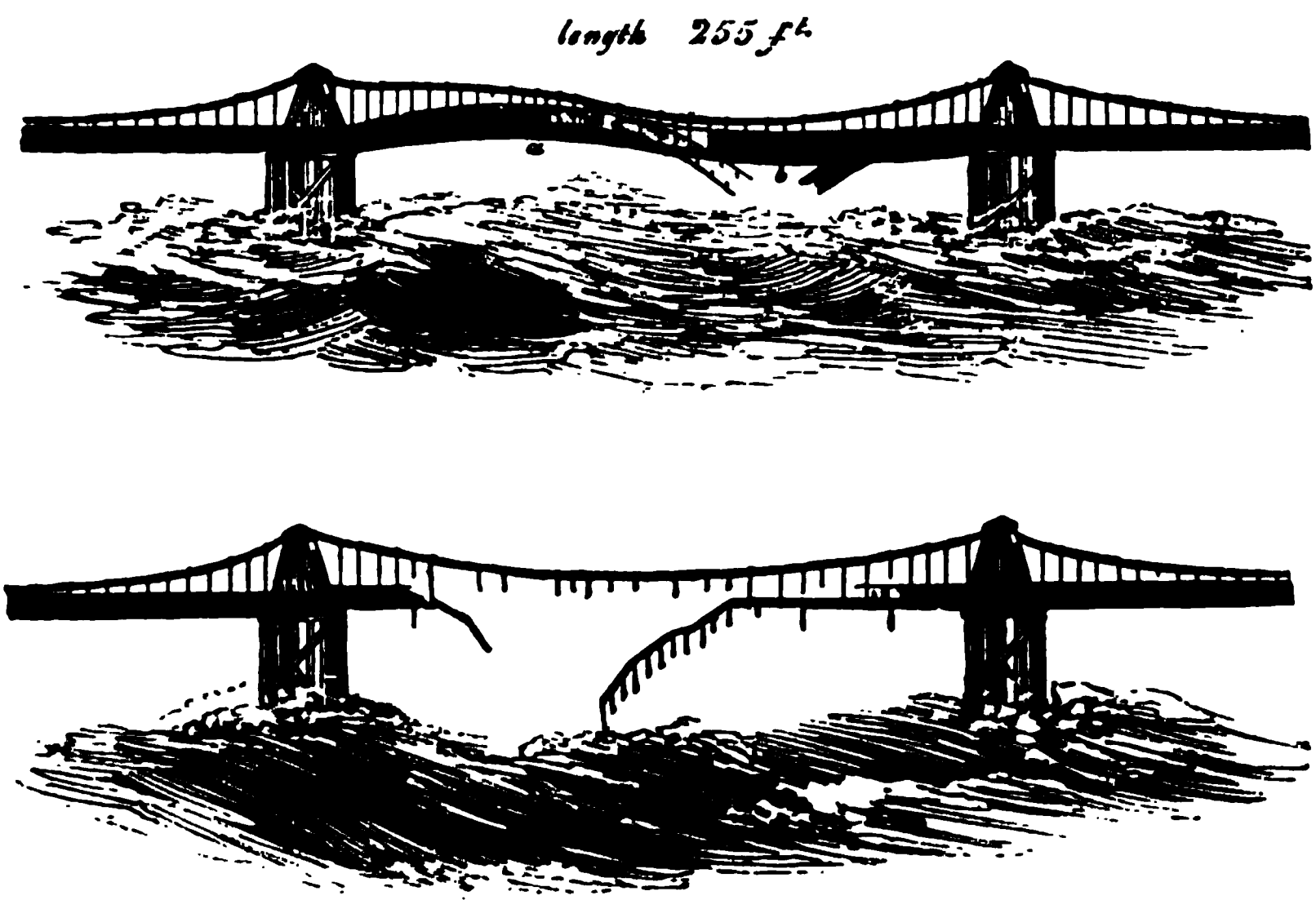
"The suspension-bridge of Montrose was inspected by me soon after it was blown up by the hurricane of the 11th of October. It was blown up from below, it being, like our English roofs, rather resting by its own weight than secured against hurricane action. The bridge at Montrose had nothing to stiffen it longitudinally in a vertical direction. Iron transverse beams, supported by the rods, had two tiers of planking over them, and a light railing on each side, like that of a common balcony. The suspension-bridge at Hammersmith, on the contrary, has railing of strong iron posts, and the rest of wood, on each side; and two longitudinal sets of king-post trusses on each side of the carriage-way and between it and the foot-paths."

Brighton Chain-pier.

Previous to this period Brighton chain-pier had been twice broken by the force of the wind: this occurred the second time during the gale of the 29th of November, 1836. Having witnessed the effect of the wind

upon it until the fracture took place, I endeavoured immediately afterwards to record the appearance, by sketches, from which the two following woodcuts have been reduced. The roadway of the pier gave way half an hour after midday of the 29th of November; about which time Mr. Osler's anemometer recorded the pressure caused by the wind's force at Birmingham as equal to 11½ lbs. on the square foot: the barometer at Greenwich had sunk to 29·24; the wind's force there being denoted by 11½.

There was a double motion in the Brighton pier, for both chains and roadway oscillated laterally and undulated longitudinally; but the latter movement increased greatly, whilst the former diminished just before the fracture took place. It was, perhaps, owing to this double motion that half the upper part of the roadway (at *b*), and half the under part (at *a*), were visible to the spectators at the same instant.



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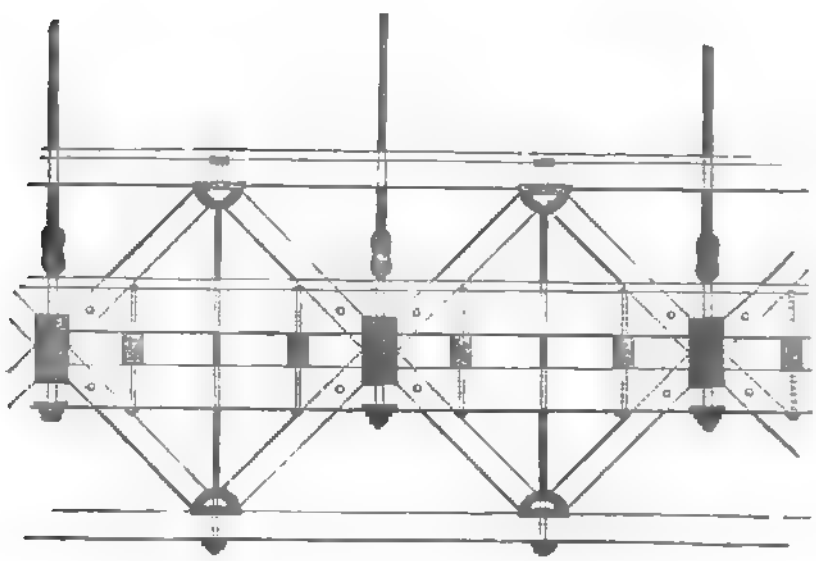
As soon as the side-rails gave way the undulations greatly increased, and almost immediately afterwards the roadway broke. It was remarked at the time that, had the side railing been a trussed rail, in all probability the pier would have withstood the force of the storm.*

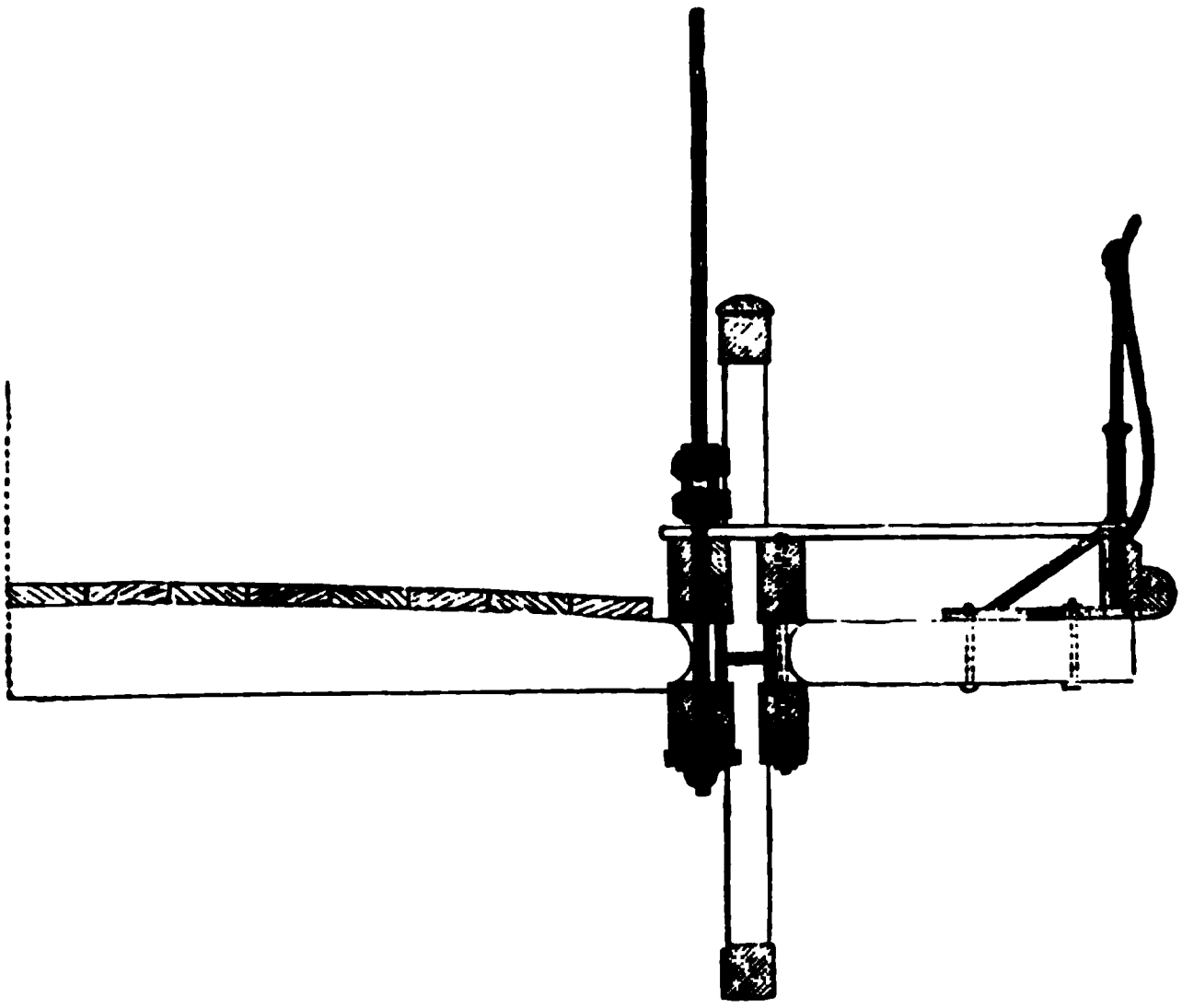
Mr. Rendell, the civil engineer, employed by Government to repair the chain-bridge at Montrose, having been so good as to send me drawings of the way in which he proposed to truss the bridge to prevent a recurrence of the same misfortune, woodcuts of Mr. Rendell's design are here inserted; for the effect of the wind on these beautiful structures does not appear always to have been sufficiently considered. It will be seen the trussed rail, proposed by Mr. Rendell, passes below the bridge as well as above it.

Longitudinal Section of Mr. Rendell's Trussed Rail for Montrose Bridge.

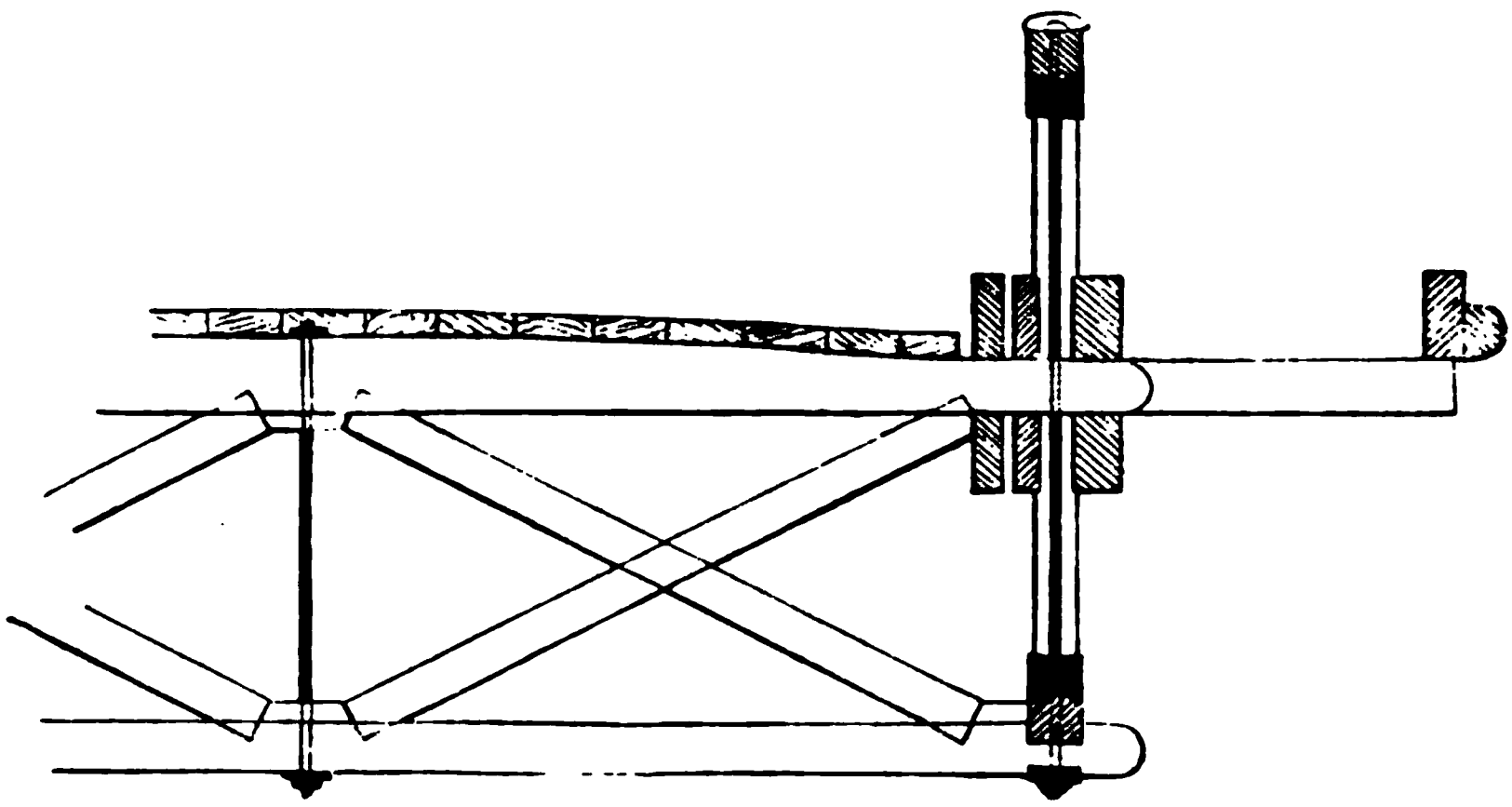


* Professional Papers of the Royal Engineers, vol. i. p. 103.

Transverse Section of Half the Roadway and One Footpath.



Transverse Section showing Cross-bracing at every 35 feet below the Roadway.



A storm which passed over England on the 28th and 29th of October, 1838, is one of much interest. From the information collected it appears to have been proceeding on a course somewhat to the eastward

A storm which came from the south-west,

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of north, and therefore coming from the westward of south. At 3 o'clock in the afternoon of Sunday, the 28th, it was calm at Portsmouth. The breeze which existed previous to the calm had left the vanes pointing from the west. I observed them turn suddenly to the opposite quarter, whilst the smoke from the neighbouring chimneys also showed that a decided change of wind had taken place. By 4 o'clock the sky, which had been clear, became overcast, and from that time all the appearances of the atmosphere indicated the approach of bad weather. The wind rose, blowing *from the eastward of south*, and soon became squally. The squalls increased, the wind veering to the south, and then towards west; and between 10 and 11 at night its violence at Portsmouth was very great. It continued increasing in force until about two in the morning of the 29th, at which time it was alarming, and appeared at its height. After daylight the wind continued to veer towards west-north-west, and the barometer rapidly rose. By the log-books of H. M. S. Etna it appears that she was in sight of the Needles at daylight of the 28th, and at noon she was becalmed. Between 4 and 5 in the afternoon she was working up to Spithead with the wind at east-south-east; the wind's force, by Captain Beaufort's scale, being marked 4. The barometer had descended from 29·70 to 29·44. Between 7 and 8 P.M. the wind was south; and at midnight it is marked west-south-west. By the Etna's log its force at 3 in the morning is expressed by the number 9.

and

passed over England.

From a statement in the Exeter newspaper, apparently made by an experienced observer, the barometer at 2 P.M. of the 28th was observed to be as low as

29.28, and the air to be saturated with vapour. In the evening the barometer continued to fall rapidly, and at 9 P.M. it was at 28.29, with squalls and heavy showers of rain. At 1 in the morning the wind was at its highest force: the barometer then standing at 28.7. At this hour, at Exeter, the wind suddenly shifted with great force from nearly south to west. At 2 A.M., on the 29th, the barometer had risen to 28.82, and by 10 o'clock it was as high as 29.27, when the gale was nearly over.

An extract of a letter addressed to me by Captain Pringle, R.E., the circumstances therein detailed having been communicated by Captain Allen, of the Adelaide, states that "the Adelaide and Leith steamers were together off Flamborough Head, 28th October, 1838. Wind north and by west, a hurricane. The Adelaide stood south-south-west, and the gale lasted three hours; the Leith, north-north-east (out to sea), and was ten hours in the gale."

By the following reports from Lloyd's list, the centre of the storm seemed to have passed over Port Talbot and Milford, and from thence proceeded nearly in the direction of Hull:—

"PORT TALBOT, 29th Oct.—It blew a heavy gale at south-east last night, which shifted suddenly to north-west at 2 A.M., and blew a perfect hurricane for about an hour. The coasters in the port all broke adrift, but no material damage was done."

"MILFORD, 29th Oct.—Yesterday the wind was moderate at south-east; at 12 last night it flew to west, and blew a perfect hurricane for five hours."

"HULL, 29th Oct.—11.15 A.M. Yesterday the wind backed to south-east and east-south-east, and blew strong till this morning, when it got round to the westward, blowing very heavy;—at 6 A.M. it flew round in a heavy squall to north; but has since backed to west-north-west, blowing hard."

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In the "Nautical Magazine" for February, 1839, further details relative to this storm may be seen. At Dublin the wind became *east-north-east*. The whole evidence indicates the storm being of a rotatory nature, although the veering of the wind in the left-hand semicircle was not regular. This in high latitudes will probably often prove to be the case.

Gave a foul wind to the Liverpool,

No incidents connected with this storm are more interesting than those which befell two great steam ships in their passage to America. One, the Liverpool, had sailed from her port some days before the storm. She had gained the 46° of lat., and 20° 50′ of long., and there on the 27th of October meeting a violent storm, was forced to put back to Cork. The other steam ship was the Great Western, which sailed at three o'clock in the afternoon of the day preceding the storm. Much anxiety was naturally felt for her safety, no accounts of her having reached England until the arrival of a ship, called the Pearl, which met the Great Western on the 29th, in lat. 50° N., and in long. 11° W. As she had by that time made good progress, there was reason for supposing she must have had the storm at east, and consequently by being more to the northward, had fallen into the left-hand semicircle of the gale, which would be to her a fair wind for America. The following letter was received from the secretary of the Steam Navigation Company, to which she belonged, relative to this subject, on the ship's return, and is a document of much interest and importance:—

and a fair wind to Great Western.

"Bristol, 13th Dec., 1838.

"Dear Sir,—On leaving King's Road at 3 P.M., 27th October, the wind was west-south-west, blowing strong and squally.

"On the morning of the 28th, wind west-north-west, and moderate, falling to a calm by noon; from noon the wind rose in sudden gusts from the southward, gradually drawing *to the eastward* until 8 P.M., when it blew a gale *at east*, with very heavy squalls and confused high sea to midnight, when the wind had gradually drawn to north-east; from that time to eight in the morning of the 29th, the wind gradually shifted to west-north-west against the sun, blowing very hard all the time; it then moderated.

(Signed) "C. CLAXTON.

"Great Western Steam Ship Office,
35, Princes-street."

In the lighthouse reports from Scotland, the wind on the 29th of October, 1838, is marked "Variable" at most of the stations; at some easterly, and at a few on the north-west course, westerly. The force of the wind in most is marked moderate, or light.

It deserves to be remarked, that by the same reports on the 27th October, it had been blowing strong from the west. If it be admitted that the storm, the course of which was over the north of England, was a rotatory storm, the left-hand semicircle would pass over Scotland with the wind easterly. But the westerly gale which just previously prevailed, would, as it encountered the easterly storm, tend to neutralize its effect, and perhaps be the cause of variable and fluctuating winds. By referring to the reports from Heligoland lighthouse, the same storm appears to have been there on the 29th and 30th of October.

Mediterranean Storms.

Inquiries into the storms of the Mediterranean possess an interest peculiar to themselves, from classical as well as from sacred history. The violent east or Levant winds, in all probability, will be found to be storms

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coming from the south-west; and they may sometimes also originate to the southward of the Sahara. We may be enabled to account for the peculiar sensations felt in the Mediterranean during the prevalence of certain winds, and to ascertain the cause of the sirocco. It is stated in different books of sailing directions that the sand of Africa has been observed to be carried far into the Atlantic by the wind.

Should it be ascertained that the storms of the Mediterranean have a northerly progression, it may be found that they sometimes carry with them impalpable powder from the deserts. When the brig of war Ferret was in the Mediterranean, a few years ago, her commander, Captain Thomas Hastings, collected a fine sand from the shrouds and rigging during a sirocco wind. This fact, and the statement which follows, will, I trust, induce those who have the opportunity for observation further to investigate into this part of the subject.

The following communication is from Dr. Davy:—

"Fort Pitt, Chatham, Dec. 25, 1838.

"The phenomena respecting which you have applied to me occurred at Malta on the 15th of May, 1830. The dust was conveyed by a sirocco, or south-easterly wind. On the same day, and about the same time of the day, a similar dust fell at Utica, over a considerable portion of Sicily, and in Sardinia; also accompanied with a south-east wind. I examined two or three different specimens of it collected in Malta, and a small quantity which was brought from Palma Bay, by the late Hon. Sir Robert Spencer, which had fallen on the deck of his ship, the Madagascar; and I found them all agreeing in appearance and chemical composition. In Italy, in many places, the phenomenon was also witnessed. Here it appeared to have occurred a day or two later. The opinion I formed at the time was, that the dust might have been raised from the desert of Africa by a *whirlwind*, carried up to a great height, and then be driven and spread over a vast

surface. At Malta when it began to fall there was a lull, the violence of the storm having ceased. I could not learn that it had fallen on the decks of any vessels close in on the African shore, or on the African coast. On Etna it is said that the dust fell less abundantly than on lower situations in Sicily. It *certainly* was *not* derived from Etna, as was at first supposed. What I have mentioned I believe may be depended on, being given from the notes taken at the time, and to which I have referred.

(Signed) "JOHN DAVY.

"Lieut.-Col. Reid, Royal Engineers."

The Storms of 1838.

The first intelligence of a severe storm on the American coast in September, 1838, was brought to England by the Montreal, New York packet, commanded by Captain Griffing. She left New York on the 13th of September. A violent gale had set in on the 10th, blowing at first from *north-east*, "and, on the wind veering more to the *northward*, this ship, with the Sheffield, for Liverpool, slipped away."

According to the theory of storms, these vessels, after putting to sea from New York for England, should have had the wind veering towards *west*, and consequently for them a fair wind. I have not been able to procure their log-books.

The storm above alluded to, however, has been clearly traced in its course, from the Bahama Islands along the coast of America; and the reports made by the officers in command of the surveying vessels, Thunder and Lark, at the Bahamas, to the Admiralty, are of very great interest. These reports have been printed in detail in "The Nautical Magazine" for January, 1839.

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H.M. ship Thunder carried round the front of the storm.

The Thunder, after dragging her anchors amongst the Bahama Islands, was carried into the Gulf Stream. Falling into the right-hand semicircle of the progressive storm, with the wind blowing in the same direction as the current of the Gulf Stream set, the Thunder was driven along faster than the storm's centre progressed. As the vessel advanced, the wind, by degrees, from being *southerly* became *easterly;* and the ship, crossing before the track of the storm's centre, got the wind from *north-east.* Then the Thunder was driven by the wind in the opposite direction to the storm's course, until her anchors, which were still dragging, helped to bring her up on the coast of Florida.

This is the explanation given by Mr. Lawrence, mate of H.M. surveying ship Thunder, of the cause for the many changes of the wind experienced on board that ship during this hurricane.

The Bermuda Hurricane of 1839.

The account of a storm, which passed over Bermuda on the night of the 11th and morning of the 12th of September, 1839, is placed amongst the storms of high latitude, because it has been traced from the tropic to Newfoundland, and over the mouth of the River St. Lawrence; and because there is evidence to show that it still partook of the nature of a revolving storm on reaching the high latitudes, as well as when passing over Bermuda, and when further to the south. In setting in, over Newfoundland, the wind was *south-easterly*, veering to *south-west;* whilst at Halifax it was *north-easterly*, ending in *north-west.*

This storm appears to have originated to the eastward of the West Indies, as it was not felt in any of the most windward islands. Whilst passing over Bermuda, it was evident that it was at that time moving on in a course nearly north; for it set in with violence at *east-south-east*, and ended at *west-south-west*.

In proof that the centre passed very near the Bermudas, the merchant schooner Jane, coming from the American continent, which had seen the islands the previous night, and hove-to to the westward of them, had the wind during the whole storm *northerly*. The centre, therefore, must have passed between this vessel and the islands, for in the islands it was *southerly*.

Northward of Bermuda its course appears to have been a little to the eastward of north, as the annexed plate will show. An abstract only is given from the various ships' reports, to show in what manner the wind was experienced by each, in order not to encumber the subject with longer details, most of which have already been printed in the Bermuda newspapers.

"The barque Euterpe, from London, bound to Antigua, encountered this hurricane in lat. 20° 36′ N., long. 46° 55′ W., on the evening of the 8th of September, having studding-sails and royals set at the time. The published log does not state which way the wind blew, but it has the expression, 'in close-reefed topsails, and furled the courses.' At eight P.M., the storm became a violent hurricane, which laid the ship over on her beam-ends; so that she was dismasted.

"The French barque La Blayaise, from Cayenne, bound to Bourdeaux, met this storm in about latitude 22°, longitude 58°, and at noon, on the 9th of September, began to feel the effect of

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the south-west part of it, having the wind at first *north-westerly*, but veering to south-west as the storm passed onwards. On the 11th, this ship fell in with and rescued the crew of the brig Scott, of New Brunswick, which had become water-logged in the same gale. Captain Arabel, of the town of Blay, on the Garonne, behaved with much kindness to the crew, and brought them to Bermuda. By the report of the master of the Scott, his ship on the 7th and 8th of September had light winds; but on the 9th, the weather became heavy, with lightning, and the wind easterly, increasing to a gale, with a very high sea. At four P.M. the vessel was hove on her beam-ends, but righted on cutting the weather lanyards, which allowed the masts to break. By eight they supposed the wind to be east-north-east; but as the master and crew were obliged to lash themselves on deck during the night, they could give no further evidence as to the veerings of the wind.

"The Scott was met with in . . . latitude 26° 14′,
longitude 57° 38′,
as reported by Captain Arabel, master of La Blayaise.

"On the morning of the 9th of September, the brigantine Devonshire, was in . . . . . latitude 24° 50′,
longitude 58° 30′,
when the master reports, 'that the wind freshened until it blew
a hurricane from . . . . . *east-north-east*;
that at four P.M., it veered first to . . *north*;
and then during the night to the . . *north-west*;
and ended about six on the morning of the
10th, a little . . . . . *south of west*.'

"The merchant brig Vincennes, was in . latitude 28° 35′,
longitude 63° 30′,
when the gale reached her about midnight, between the 9th and 10th of September. 'The wind blew *easterly* until six o'clock in the morning, when it was north-east, increasing with violence, and constant rain. By noon the wind was north-north-east, still increasing in violence. Between eleven and twelve very violent, so as nearly to throw the brig on her beam-ends; soon after it lulled for about half-an-hour, the wind at the time
becoming . . . . . *north-westerly*.
By one A.M., of the 11th, it blew with increased
violence from . . . . . *south-west*,
and afterwards became . . . . . *south*.'"

Course
of the
BERMUDA HURRICANE
of the
12th Sept. 1839.
Newfoundland
Quebec
Halifax
Boston
New York
Philadelphia
Chesapeake
Margaret
Daphne
Queen Victoria
Damsel
Bermuda
Jane
Vincennes
Scott
Devonshire
Hayti
Barbados
Antigua
Guadaloupe
Dominica
Trinidad

Indications of the coming storm.

By referring to the Chart it will be seen that the storm was upwards of six hundred miles from the Bermudas on the 9th of September; yet, at that period, a swell had begun to roll on the south side of the islands, and to break on the south shore with a loud noise. This indication of a storm in the neighbourhood gradually increased until the 11th, when the barometer began to give corroborative warning that a gale was approaching; and it was also observed that the sea assumed that brown or muddy colour which the inhabitants remark to take place in violent storms. In the afternoon of the 11th, the surf broke against the south side of the island with great grandeur. The wind blowing very fresh, and somewhat unsteady, was generally to the northward of east; but between eight and nine at night the true storm seemed to reach the islands; for then the wind blew in hard squalls from east-south-east. The barometers continued to descend to 28.3 inches, and the wind to become *more southerly*, until about five on the morning of the 12th, after which the wind was *south*. Then the barometers began to rise, and the wind to veer gradually towards *west-south-west;* and it moderated about one or two in the afternoon.

During the hardest part of the gale, several persons observed remarkable oscillations of the mercury in the tubes of the barometers.

The following is a copy of the Weekly Report of the weather; a similar Report to which is printed each week in the "Bermuda Gazette," and afterwards deposited in the Library of the Colonial Office, in London.

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Weekly Report of the Weather, from the Central Signal Station at Bermuda, between the 8th and 14th September, 1839; height above the Sea being 134 feet.

Date. Sept. 1839.	Hours.	Direction of Wind.	Wind's force.	Weather.	Bar.	Ther.	General Remarks.
8th,	Noon	S W	2	b.	30.1	85.	
9th,	Noon	S	3	b.	30.14	85.	Sea breaking loudly on south side.
10th,	Noon	N E	3	b. v.	30.15	85.	Wind veered to N by E at 5 P.M. Lightning in the south at 8.25 P.M. Sea breaking louder on south side. Weather threatening.
11th,	Noon	S E by E	5	b. c. m.	29.95	87.	Threatening appearance of the weather.
	P.M. 5	N E by E	6	m. u.	29.83	85.	Sea roaring on south side.
	8	S E	6	o. u. r.	29.8	84.	Wind veered to S E by E; very heavy rain & lightning.
	11	S E by S	8	o. l. r.	29.6	83.	
	Midn.	S E	10	o. r.	29.5	82.	A whole gale at this hour.
12th,	A.M. 1	S S E	11	o. r.	29.35	82.	Storm; barometer falling rapidly.
	2	S S E	11	o. r.	29.2	82.	Every appearance of a hurricane.
	3	S S E	12	o. r.	28.85	81.	
	4	S S E	12	o. r.	28.64	81.	Hurricane.
	5	S S E	12	r.	28.3	81.	
	7	S	11	r.	28.72	81.	More moderate.
	9.45	S W	9	m.	29.	81.	
	Noon	W S W	8	v.	29.43	79.	
	P.M. 7	W by S	4	b.	29.9	79.	Quite moderate; storm right.
13th,	Noon	N W	3	b. c. m.	29.94	79.	High sea breaking at north reef.
14th,	Noon	N E	3	b.	30.14	78.	
	Midn.	E	4	c.	30.1	76.	Squall at 9.40 P.M.

JOHN MAHON, Sergeant 30th Regiment,

Signal Director.

By examination of the south coast of the islands, the sea was found to have risen fully eleven feet higher than the usual tides. It carried boats into fields, thirteen feet above the usual high water mark, and removed several rocks, containing by measurement twenty cubic feet; some of them bearing evidence of having been broken off from the beds in which they rested by the surge. On the north and leeward side of the island, and within the camber of the dock-yard, the water was observed to rise two feet and a half higher than the ordinary tides.

As the weather became fine at Bermuda, and the hurricane proceeded on its course, the northern reefs of the islands, in their turn, presented a line of white surge from the swell rolled back by the gale.* Vessels, as they arrived from the east or the west, reported that they met the wind in conformity with what appears to be a law of nature in these tempests. Thus, the Jane coming from Baltimore and the westward, had the wind *northerly;* whilst the schooner Governor Reid, from England and the eastward, had the wind *southerly.*

On the arrival of the brig Lottery at Bermuda, it was ascertained that she was becalmed in latitude 27° 1′ N., longitude 71° 52′. At the same time that the Vincennes was in the centre of the hurricane, the Lottery experienced a heavy swell.

"The storm reached the schooner Damsel about midnight, between the 11th and 12th, blowing from the . . *north-east,* and veering to . . . . . *north-west.*

"It was six in the morning of the 12th before the storm overtook the Daphne (in latitude 35° 38′, longitude 65° 24′), a

* See the Engraving of the Bermuda Hurricane of 1839 in the "Progress of the Development of the Law of Storms," and the Chapter "On the Swell raised by Storms."

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schooner, which had sailed from Bermuda for Halifax, on the 10th, at noon. The master, Captain Ingham, states, 'But for the warning given by the barometer, we must have been dismasted.' The wind with the Daphne at 6 A.M. was E.N.E. and its force marked 6

At noon it was	N.E	Force	11
At 2 P.M.	N.N.E	„	12
At 4 P.M.	N.	„	12
At 6 A.M. 13th Sept.	N.W.	„	9
At noon	N.W. by W.	„	7

On the morning of the 11th, the barometer of the Daphne stood at 29.95
and from that time it fell with great regularity to 29.1
At 4 P.M., on the 12th, the wind was *north*, and consequently the vessel may be supposed to have been, then, due west of the centre of the storm."

Extract from the Log-book of the Brigantine STANDARD, Thomas Blay, Master, from Jamaica, towards Halifax, N.S.

"Wednesday, 11th September, 1839.—Commences with light variable airs from north-east to south-east, and clear sky; all sail set. At 8 A.M., civil time, moderate breezes from north-east, accompanied with light showers of rain, and a very heavy swell from that quarter: latitude by observation 34° 3′, long. by chron. 66° 6′ at noon. At 8 P.M. strong breezes, the sky to the eastward very dark and gloomy, whilst it remained quite clear to the westward up to midnight: took in the gaff-topsail and royal, and single-reefed the topsail; light showers of rain occasionally, and a very heavy swell—the wind and swell still from north-east. At midnight, strong breezes without rain, the sky to the eastward very gloomy.

"Thursday, 12th September.—Commences with strong breezes, and dark gloomy sky, the wind blowing steady from north-east. At 6 A.M. it commenced raining, the wind increasing rapidly every instant; so suddenly indeed did the storm commence, that we were compelled to clew up and furl every sail set as quick as possible, without stopping to reef; and in one hour after, I found it necessary to shorten sail—we were laying-to under the storm-trysail. At 7h. 30m. A.M. sent down top-gallant-yard, housed top-gallant-mast and main-topmast. From 9 A.M. to noon it blew tremendously hard in gusts, but we had little rain; lat. at noon, by account, 35° 5′ N., long. 67° 8′ W. At 1 P.M. the swell appeared to set more from the northward,

the wind shortly after commenced to back gradually. At 2h. 30m. P.M. the wind was at north-north-east; the sky to the northward began to open, and the wind to moderate. At 4 P.M. wind north, sky clearing fast, wind still moderating, saw a brig scudding to the southward. At midnight, wind north-west, clear sky, wind moderating fast, and sea falling; wore ship, and made sail to the north-east.

"*Remarks.*—I remark that I have experienced several hurricanes at sea, and have invariably found, that *by observing strict attention to the set of the swell previous to the commencement, and even after, a tolerable correct idea may be formed of the direction the wind is likely to take.*

"I particularly noticed this in the last two which I experienced; and on the 2nd Sept, 1838, in a hurricane that commenced at east-north-east, although the sea when I first hove-to, set from that quarter, I found it afterwards altered its direction, and came from south-east, and for some time before the wind shifted to that point.

"I felt so confident from that circumstance that I should have the hardest of the storm from that quarter, that I continued to lay-to on the starboard tack, well knowing that when the wind shifted I should head the sea much better, and consequently the vessel would lay safer.

"In the storm of the 12th September last, although the sky looked much more dismal in the south-east than any other direction, the swell gave no indication of the wind coming from that quarter, as it set constantly from the northward.

"T. W. BLAY."

The Victoria sailed from Bermuda from New York, on the 9th. The storm overtook her when in the position shown in the chart, with the wind blowing at *north-east*, which caused her to heave-to for six hours.

The Grant, on her voyage from Baltimore, was either beyond its influence, or very nearly so; for she had no occasion to take in any sail.

The mail-boat Margaret had sailed from Bermuda to Halifax, a few days before the storm. She was overtaken by this gale, and lost her topmast, in . . . . latitude 37° 30′, longitude 64° 10′.

The Ariel had the wind from north-east; the Joseph Porter from east-south-east, veering to south and south-west.

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The brig Hester had the wind from south-south-east, veering to south-south-west and west.

The mail-boat Roseway, in her passage from Boston to Halifax, in . . . . . latitude 42° 50′, longitude 64° 51′, was overtaken by this storm about four o'clock in the morning of the 13th. At that hour her sails were double-reefed.

At eight A.M., the wind was . . . *east-north-east*, increasing so that the vessel was hove-to.
At nine the wind was marked . . . *north-north-east*.
At one P.M. . . . . *northerly*.
Later in the afternoon it moderated with the wind . . . . . *north-west*.

The following Extract from the Log-book of H.M.S. CROCODILE, commanded by Captain Milne, shows what the weather was at Halifax.

"HALIFAX.—September 13th, eight A.M. Barometer 29.90. Morning, cloudy with rain; wind north-east; force four to five. Eleven. Wind freshing up in squalls, barometer falling, 29.80. Noon to one P.M. Strong gales and heavy squalls of wind and rain; wind hauling round now north by east.—1.30. Very heavy gusts of wind; barometer 29.3; Crocodile parted her moorings.—Two to three. Wind north by west; barometer 29.2; a complete hurricane of wind, with heavy rain.—4 P.M. More moderate; barometer rising, now 29.5.—Seven. Moderate, with occasional *gusts* of wind.—Nine. Moderating; wind north-west by north.—Ten. Barometer 29.7."

"September 14th, eight A.M. Wind moderate; fine; wind north-west by west; barometer 30.20."

H. M. S. Cleopatra was twenty-five miles south-south-east of St. John's, Newfoundland, on the 13th of September.

In the morning the wind is marked variable;		force 1.
Ten A.M. . . .	east-south-east;	force 2.
Noon . . .	south-south-east;	force 5.
Three P.M. . . .	south-south-west;	force 6.
Five P.M. . . .	south-west;	force 6.
Midnight . . .	south-south-west;	force 8.
One A.M., 14th September	south-west;	
Eight . . .	west by north;	force 7.

From which time the wind's force diminished until the gale ended.

"St. John's, Newfoundland.—September 13th, eight A.M., noon. Barometer 29.90. Ten P.M. Barometer 29.67; wind south-west; 3. b. c.

"September 14th, six A.M. Barometer 29.64; wind south-west; cloudy.—Ten A.M. Barometer 29.70; wind west; force seven to eight.—Noon. Wind west; force eight to nine.—Three P.M. Barometer 29.90; wind west; force seven.—Seven P.M. Wind west; force five; and cleared up.

"Taken from the Register kept by Mr. Templeman, Colonial Office.

"Alex. Milne."

The following data I received from Mr. Redfield.

"Brig Alfred Taylor. September 13th, latitude 43° 30′ N., longitude 62° W., experienced a severe gale from east-south-east to north-north-east."

"Ship Echo. September 12th, latitude 43° N., longitude 63° W., experienced a severe gale from north-east, lasting eight hours."

"Ship Lucretia. September (date not given), experienced a most violent hurricane from south-east, shifting rapidly by south-west to north-west; latitude 43° N., longitude 62° W."

"Ship Cosmo. September 13th, latitude 41° 50′ N., longitude 62° 37′ W., experienced a severe gale from south-east."

"Ship Lancashire. September 13th, experienced a hurricane from east; latitude 41° 30′ N., longitude 63° W."

"Ship Emerald. September 13th, latitude 40° 8′, longitude 62° 50′ W., experienced a severe hurricane from east, veering round by south to west, and west-north-west."

"Barque Madonna. September 13th, experienced strong gales from north-north-east to north-north-west and north-west; latitude 36° 19′ N., longitude 71° 26′ W."

"Brig Angola. September 13th, experienced heavy gales from north-north-east; latitude 36° N., longitude 68° W."

"Schooner Ganges. September 10th, experienced a hurricane from east; latitude 29° 15′ N., longitude 62° 10′ W."

H. M. ship Andromache, commanded by Captain Baynes, was in the Gulf of St. Lawrence, and an extract from this ship's log is here printed in detail.

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Extract from the Log of H. M. S. ANDROMACHE, commanded by Captain Baynes, 12th Sept. 1839, in the Gulf of St. Lawrence.

H.	K.	F.	Courses.	Winds.	F.	W.	Ther.	Bar.	Sem.	Remarks.
A.M.										September 12, 1839.
1										A.M. 4. Fine.
2										Single anchor in Paspabiac.
3										8.30. Shortened in cable; made sail.
4										8.45. Weighed, and proceeded.
5										9.20. Set royals; up mainsail.
6				W	4	b				9.30. Trimmed and set starboard fore and main top-gallant, and fore-topmast studding-sails.
7										
8				W by N	4					Standing out of the harbour.
9										
10										Observed a barque standing out of the Bay of Chaleur.
11			E S E							Running from Miscou.
12					4	b	60	29.85	29.90	Noon. Fine, three sail in sight.

Course.	Dist.	Lat. N.		Long. W.		Bearings and Distance at Noon.
..	..	..	..	.	..	NW part of Miscou, E ½ S 9′ or 10′.

P.M.										P.M. 2. Shortened sail, and hove-to off the fishing establishment, Miscou Point; sent a boat with an officer to communicate with ditto.
1										
2										2.45. Boat returned; up ditto; filled and made sail to the N N E. Running for Bonaventura.
3			NE by N	N W	4	b				
4							[redacted]	20.91	30.00	
[redacted]										
6										6. Mustered at quarters; in second reefs of topsails.
7										

Extract from the Log of H.M.S. ANDROMACHE—*continued.*

H.	K.	P.	Courses.	Winds.	F. W.	Ther.	Bar.	Sem.	Remarks.
P.M.									September 12, 1839.
8				Calm.	0	59	29.91	30.00	8. Nearly calm. Bonaventura, W by S, 2′ or 3′. Hove-to off ditto.
9				N W Variable					9.30. Up foresail, down jib, and hove-to on larboard tack. Standing off and on.
10									10.15. Set jib, wore and filled on starboard tack.
11									Isle of Bonaventura.
12				N E	2				12. Fine, with an aurora borealis.
A.M.									September 13, 1839.
1									A.M. At 3, tacked.
2									Standing off and on Bonaventura.
3									
4									4. Bonaventura, W by S, 5′ or 6′.
5									
6									6. Set foresail. 8. Persé, W S W, 2. Working to windward towards Cape Gaspé.
7									
8						59	29.95	30.4	8.20. Tacked; communicated with a boat from the shore; out second reefs, set mainsail, and flying jib.
9									
10				N N E	5 6	54	29.90	30.2	10.45. Spoke the barque Pallas of Cork, from ditto, out twenty-eight days. In top-gallant-sails, and second reefs of topsails.
11					to				11. Tacked. 11.20 ditto; set top-gallant-sails.
12				N	7	46	29.88	29.84	12. Tacked; in top gallant-sails. Barque in company.

Course.	Dist.	Lat. N.		Long. W.		Bearings and Distances at Noon.
..	..	..	..	..		Flat Island, N W, 2′ or 3′.

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Extract from the Log of H.M.S. ANDROMACHE—*continued.*

H.	K.	F.	Courses.	Winds.	F.	W.	Ther.	Bar.	Sem.	Remarks.
P.M.										September 13th.
1				N by E	7					P.M. Tacked occasionally; working to windward towards Cape Gaspé; found a very strong lee current running.
2										
3					8					At 1.30, set top-gallant-sails. 3.30. In ditto; working short tacks round Flat Island, to try and evade the current; find we gain but very little on each tack.
4										
5					9	c				4. Close-reefed spanker; four sail in sight. 5.30. Gale increasing; close-reefed the topsails; reefed the courses; down top-gallant-yards, and struck the masts.
6										
7	2	6	E N E	N		c o q				Cape Gaspé. N N W, 4′ or 5′; bent storm-staysails.
8	2	6			9	r	49	29.50	29.60	7. Furled the main-sail. Secured main-deck-ports, &c.
9	3									8. Set main-trysail. 9. Down fore-top-mast-staysail.
10	1	6	up E N E off			c				Set fore-storm-stay-sail. Furled spanker.
11	1	4	E by N	N	10	q r				In fore and mizen-sails; furled ditto; got preventer braces on the yards.
12	1	4			10		50	29.50	29.65	12. Heavy sea getting up.
A.M.										
1	1		up N E by E off			q r				September 14.
2	1		E by N	N by W	10	c r				A.M. Blowing hard at times in squalls.
3	1		up N N E			o c				
4	1		[illegible]		10		53	29.70	29.80	4. Squally; at daylight saw Cape Gaspé, bearing N W. Observed the barque about eight or nine miles on the lee quarter.
5	1		N E by E							
6	1		up N N E off							7.30. Wore, and set foresail.
7	1		N E by E	N W	9	c				

Extract from the Log of H. M. S. ANDROMACHE—*concluded.*

H.	K.	F.	Courses.	Winds.	F.	W.	Ther.	Bar.	Sem.	Remarks.
A.M.										September 14th.
8	1	4	W by S		10		53	29.84	29.85	8. More moderate, with a heavy sea. 8.30. Set close-reefed fore-topsail.
9	4	6			9					9 Set ditto. 10.30. Set out fourth reefs of topsails and reefs of courses. Fidded topgallant masts; crossed the yards.
10	5	4		Variable	8					
11	4		W		7 to					Set close-reefed spanker, mainsail, and fore-topmast-staysail; in main-trysail.
12	3		W by N		6		53	29.95	30.10	Noon. Moderate, with northerly swell; two sail in sight.

Course.	Dist.	Lat. N.	Long. W.	Bearings and Distance at Noon.
..	.	.. ..	.. ..	Cape Gaspé N N W. Bonaventura W N W 5 or 6 leagues.

1	3		W N W	N	4	b				P.M. 1.30. Out second reefs; set topgallant-sails; out reefs of spanker; set jib.
2	3									
3	4		N W	N N E	3	b c				3. Set royals and starboard top-gallant-studding-sails.
4	3	4	N by E	E			52	30.00	30.12	4. Out first reefs; set starboard fore-topmast-studding sail.
5	3			S E	3					5. Flat Island bore N W by W three or four degrees.
6	2			Variable						6. Mustered at quarters; observed a strong current setting down upon Flat Island from the northward, round Cape Gaspé.
7	3			N N W						
8	3				2		58	30.10	30.12	8. Trimmed; in studding-sails.
9	2									9. Nearly calm. Beating up the Bay of Gaspé.
10	1				1					10. Tacked; hove-to, head to the N E off Grand Grève.
11										
12										12. Nearly calm.

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By the journal of Mr. Redfield, at New York, on the 12th of September, the wind was .... *south-west*, but it freshened on the 13th, and became . *northerly*. The barometer, which had been standing at. . . 30.08, began to rise; and at ten A.M. of the 14th, reached 30.48

By the report of a Bermuda vessel, commanded by Captain Whitney, which was to the eastward, and beyond the reach of the storm itself, the wind was southerly.

Th e [illegible] U.L.

CHAPTER X.

ON MEASURING THE WIND'S FORCE.

THE first successful attempt for measuring the force and velocity of the wind, that I am aware of, was that of the Rev. Dr. Whewell, Master of Trinity College, Cambridge, who thus describes it, in a paper printed in the Transactions of the Cambridge Philosophical Society.

Whewell's anemometer.

A fly (resembling the fly of a revolving ventilator, or the sails of a windmill) is fixed to the small end of the vane of a weathercock, so as always to be turned with its circular disk to the wind; and it consequently revolves, by the action of the wind, with a rapidity increasing as the force of the wind increases. The revolutions of the axis of this fly are converted by a train of toothed wheels and screws into a vertical motion, by which a pencil is carried downwards, touching the surface of a vertical cylinder, the cylinder having the axis of the weathercock for its axis. As the vertical rod on which the pencil slides is attached to the vane of the weathercock, the point of the compass from which the wind blows is recorded on the side of the cylinder on which the mark is made; while the *quantity* of the wind is represented by the extent of the *descent* of the pencil.

One of the difficulties which most interfered with the precision of the observations was that which arose from the *wavering* of the wind. The weathercock is

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in almost constant motion, swinging to and fro through an arc often not less than a quadrant; and the consequence is, that the pencil describes upon the cylinder, not a single line, but a broad path of irregular form, made up of the transverse line which the oscillation of the vane occasions. It might at first be supposed that this oscillation arose from the momentum of the vane, and might be remedied by some contrivance which should cause the change of direction of the wind to come into effect more slowly. But the cause of this oscillation is in reality almost entirely the constant shifting of the wind, as may be seen by examining the motions of the vane; for it often swings into a new position, or stands still awhile, before it swings back again.

Whewell's anemometer was erected at Cambridge, Edinburgh, Greenwich, and Plymouth, in 1838.

Osler's anemometer.

In the year 1837, another instrument, for the same purpose, and of very ingenious construction, was explained to the British Association by the inventor, Mr. Follett Osler.

Extract from the Report in the "Athenæum" for Sept. 16, 1837, of the proceedings of the British Association, at Liverpool.

"In Mr. Osler's instrument, the direction of the wind is obtained by means of a vane attached to a rod, or rather tube, that carries it; and consequently causes the latter to move with itself. At the lower extremity of this tube is a small pinion working in a rack, which slides backwards and forwards as the wind moves the vane; and to this rack a pencil is attached, which marks the direction of the wind on a paper ruled with the cardinal points, and so adjusted as to progress at the rate of half an inch per hour by means of a clock. The force is at the same time ascertained by a plate one foot square, placed at right angles with the vane, supported by two light bars running on friction-rollers, and communicating with a spiral spring in such a way that the

plate cannot be affected by the wind's pressure without instantly acting on this spring, and communicating the quantum of its action by a light wire passing down the centre of the tube to another pencil below it, which thus registers the degree of force.

"The rain is registered at the same time, by its weight acting on a balance, which moves in proportion to the quantity falling; and has also a pencil attached to it recording the result. The receiver is so arranged as to discharge every quarter of an inch that falls, when the pencil again returns to zero."

It is sufficient to supply the instrument once in twenty-four hours with a sheet of paper ruled to the proper form.

In order to render the observations recorded by his anemometer and rain-gauge as generally useful and available as possible, Mr. Osler has adopted a plan for giving a condensed and comprehensive view of the records obtained.

Having been much struck with the manner in which this anemometer records the squalls, writing their force at the same time that it gives the veering of the wind, and the quantity of rain that falls, showing also the precise time of their occurrence, Mr. Osler has done me the favour to copy a portion of his condensed registers (which is here engraved and annexed) for fourteen days in the month of February, 1837, made by collecting and condensing the work of the instrument, and adding to it the heights of the barometer, thermometer, and hygrometer; so that we see at a glance six simultaneous comparisons. It is divided into days, and the days into hours.

See plate opposite to page 453.

The upper portion records the rain which has fallen, and the hour at which each portion fell. Thus the first fall of rain commenced on the 10th of February, at ½ past 4 P.M., and ceased at a ¼ before 6 the same

afternoon. The next portion, amounting to ·52 of an inch, began the following day at 6 A.M., and ended at 11 A.M. The rate at which these descended was regular, but the rest marked on the register fell at various rates; sometimes very rapidly, and then almost ceasing, as the different inclinations of the line indicate.

The next division of the table gives the variations in the current of the wind, together with its degree of force. These observations are condensed from the registers of the anemometers, thus:—The course as recorded is not a definite line, owing to the oscillations of the vane, produced by the waves or pulses of the wind, already referred to in the extract from Professor Whewell's paper: the mean, however, of these oscillations gives the absolute direction, and this is the line transferred to the table.—See the dark line, A.A.A.

On this line, as a base, is drawn the force of the wind at the time, represented by lines perpendicular to it, and varying in length according to the pressure; thus showing the force and direction of the wind on the same division of the paper. The bars which cross the perpendicular lines, and run parallel with the direction line, denote each 1 lb. pressure on the square foot. Thus, on the morning of the 10th of February, the wind was south by west, with a pressure of 2 lbs. on the square foot; and between five and six in the afternoon it veered to about south-west, and increased in strength to a gale, with 6 lbs. pressure on the square foot: then the wind began to abate, declining in pressure to what it was before.

On the 11th of February the force of the wind was only 1 lb. on the square foot; and the register shows it

backing to the south-east. By referring to the portion showing the register of the barometer, we find it descending until it comes to 28·50; and we find by the register of the thermometer and hygrometer that the air was saturated with moisture. The line which denotes the direction of the wind shows that it veered from south-east to *south*, and then to *west*; and as it veered it blew a gale of 9 lbs. pressure to the square foot. The rain registered just above this is the heavy rain alluded to before.

The state of the barometer is taken at 9 A.M. and 3 P.M. daily. The daily maximum and minimum temperatures are denoted by two black lines, and the temperature at 9 A.M. by a dotted line. The dew-point, taken at the same hour, is marked by an arrow head.

These fourteen days were selected by Mr. Osler as strikingly illustrative of the extraordinary meteorological changes which accompany squally weather.

A gale in the south of England, which blew down trees, and broke the chain-pier at Brighton, on the 29th of November, 1836, approached in violence almost to a hurricane. Mr. Osler's anemometer had then been set up at Birmingham; and it has recorded the wind on that occasion as blowing with a force equal to the pressure of 11½ lbs. on the square foot. A squall the day before, which lasted but a few minutes, yet did much damage, blew with a pressure equal to 17 lbs. on the square foot; the wind veering at the time from south-west towards south, and ·10 of an inch of rain fell at the same moment.

Mr. Osler informed me, that, being desirous practically to ascertain the force exerted by the wind at

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various velocities, he made a few experiments for that purpose while travelling on a calm day on a railroad. No very great degree of accuracy was attempted; but, as far as the experiments went, they fully corroborated the tables published many years ago by Dr. Lind, of Edinburgh, of which the following is a copy:—

Scale of Pressure on One Square Foot.

Pressure on one square foot in lbs. Avoirdupois.	Miles per hour.	Feet per second.	Observations.
·005	1	1·47	Hardly perceptible.
·020	2	2·93	Just perceptible.
·044	3	4·40	
·079	4	5·87	Gentle, pleasant wind.
·123	5	7·33	
·492	10	14·67	Pleasant gale.
1·107	15	22·00	
1·968	20	29·34	Brisk gale.
3·075	25	36·67	Very brisk gale.
4·429	30	44·01	Storm.
6·027	35	51·34	Great storm.
7·873	40	58·68	Tempest.
9·963	45	66·01	Violent tempest.
12·300	50	73·35	Hurricane.
17·715	60	88·02	Most violent hurricane.
31·490	80	117·36	
49·002	100	146·07	

Since the first edition of this work was published Mr. Osler's anemometer has been placed at several places in India as well as in Europe.

A measure of the wind's force, as regards its strength, to be inserted in the log-books of ships, proposed by the hydrographer to the Admiralty, Captain Beaufort, is now ordered by the Admiralty to be adopted in the Royal Navy. The concise mode of inserting this measure, as well as the description of the weather, first adopted at Greenwich Observatory, is so great an improvement, that it is annexed; in the

hope that, when generally known, it will be used both in ships at sea, and for recording the winds's force on land.

Figures to denote the Force of the Wind.

0 denotes	Calm.		
1 „	Light air	just sufficient to give ...	Steerage-way.
2 „	Light Breeze..	with which a well-conditioned man-of-war, under all sail, and clean full, would go in smooth water, from	1 to 2 knots.
3 „	Gentle Breeze .		3 to 4 knots.
4 „	Moder^e Breeze		5 to 6 knots.
5 „	Fresh Breeze .	in which the same ship could just carry close hauled	Royals, &c.
6 „	Strong Breeze		Single-reefs and top-gallant-sails.
7 „	Moderate Gale		Double-reefs, jib, &c.
8 „	Fresh Gale ...		Triple-reef, courses, &c.
9 „	Strong Gale ..		Close-reefs & courses.
10 „	Whole Gale..	with which she would only bear	Close-reefed main-topsail and reefed foresail.
11 „	Storm.....	with which she would be reduced to	Storm-staysails.
12 „	Hurricane....	to which she could show	No canvas.

If the above mode of expression were adopted, the state of the wind, as well as its direction, might be regularly marked, every hour, in a narrow column on the log-board.

Letters to denote the State of the Weather.

b	denotes	Blue sky; whether with clear or hazy atmosphere.
c	„	Cloudy; *i.e.*, detached opening clouds.
d	„	Drizzling rain.
f	„	Fog—f Thick fog.
g	„	Gloomy dark weather.
h	„	Hail.
l	„	Lightning.
m	„	Misty or hazy—so as to interrupt the view.

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o	denotes	Overcast—*i.e.*, the whole sky covered with one impervious cloud.
p	„	Passing showers.
q	„	Squally.
r	„	Rain—*i.e.*, continuous rain.
s	„	Snow.
t	„	Thunder.
u	„	Ugly threatening appearance in the weather.
v	„	Visibility of distant objects, whether the sky be cloudy or not.
w	„	Wet dew.
.	„	Under any letter denotes an extraordinary degree.

By the combination of these letters, all the ordinary phenomena of the weather may be recorded with certainty and brevity.

EXAMPLES.

b c m—Blue sky, with detached opening clouds, but hazy round the horizon.

g v̇—Gloomy dark weather, but distant objects remarkably visible.

q̇ p d l ṫ—Very hard squalls, and showers of drizzle, accompanied by lightning with very heavy thunder.

CHAPTER XI.

ON WATERSPOUTS AND THE SMALLER WHIRLWINDS; AND ON THE FALL OF FISHES ON LAND.

On Waterspouts and the Smaller Whirlwinds.

Of the different atmospheric phenomena, none are more curious than waterspouts. That they cause small whirlwinds there seems no reason to doubt; but I regard them as phenomena of a different nature from the great extended storm. Since the first edition of this work was published it has been found that the waterspout, or whirlpillar, does not revolve always in the same direction.

That which renders the waterspout remarkable is the circumstance of a double cone being formed when the phenomenon is complete, one cone pointing downwards from a cloud, whilst another points upwards from the sea. The thin semi-transparent columns, which stalk, as it were, on the surface of the ocean in calm weather, though no cloud is to be seen above them, as well as the small agitated circles, which are only seen by their marking the smooth surface of the sea in their gyrations, may probably have the same origin as the waterspout. One of these circles, which appeared too insignificant to do harm, after performing many gyrations near a ship commanded by Captain Marquis, on the coast of Malabar, suddenly approached

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her, as she lay becalmed, with her sails loose, and, passing across her bows, carried off the flying-jib and jib-boom into the air, higher than the mast-head. I have myself witnessed these semi-transparent columns, within the tropics, without being able to decide which way they turned round; and the spiral form in which they are said to revolve may be the reason.

Captain Beechey's water-spouts.

The following account I received from Captain Beechey, R.N.:—

"While we were off Clermont Tonnerre we had a narrow escape from a waterspout of more than ordinary size. It approached us amidst heavy rain, thunder, and lightning, and was not seen until it was very near to the ship. As soon as we were within its influence, a gust of wind obliged us to take in every sail; and the topsails, which could not be furled in time, were in danger of splitting. The wind blew with great violence, momentarily changing its direction, as if it were sweeping round in short spirals: the rain, which fell in torrents, was also precipitated in curves, with short intervals of cessation. Amidst this thick shower the waterspout was discovered, extending in a tapering form, from a dense stratum of cloud to within thirty feet of the water, where it was hid by the foam of the sea being whirled upwards by a tremendous gyration. It changed its direction after it was first seen, and threatended to pass over the ship; but, being diverted from its course by a heavy gust of wind, it gradually receded. On the dispersion of this magnificent phenomenon we observed the column to diminish gradually, and at length to retire to the cloud from whence it had descended, in an undulating form.

"Various causes have been assigned for these formations which appear to be intimately connected with electricity. On the present occasion a ball of fire was observed to be precipitated into the sea, and one of the boats, which was away from the ship, was so surrounded by lightning, that Lieut. Belcher thought it advisable to get rid of the anchor by hanging it some fathoms under water, and to cover the seamen's muskets. From the accounts of this officer and Mr. Smyth, who were at a distance from the ship, the column of the waterspout first descended in a spiral form, until it met the ascending column a short distance

from the sea: a second and a third were afterwards formed, which subsequently united into one large column, and this again separated into three small spirals, and then dispersed. It is not impossible that the highly rarefied air, confined by the woods encircling the Lagoon Islands, may contribute to the formation of these phenomena.

"Neither the barometer nor sympiesometer were sensibly affected by this partial disturbance of the atmosphere; but the temperature underwent a change of eight degrees, falling from 82° to 74°: at midnight it rose to 78°. On the day succeeding this occurrence several waterspouts were seen at a distance, the weather being squally and gloomy."

Clermont Tonnerre is in south latitude, and is one of the group of islands called "Dangerous Archipelago," about lat. 19° S., long. 137° W.

Having applied to Captain Beechey, in the hope that he might be able to explain in which way the gyrations of wind which accompanied this waterspout revolved, I received from him the following explanation:—

"The gyrations were in a direction *contrary* to that of the hands of a watch: if it had been otherwise the ship would have changed her tack, whereas she only broke off. She was on the starboard tack, and the waterspout came down upon the weather-beam, and passed under the stern. At first the ship broke round off seven or eight points, and afterwards kept coming up and breaking off, as the gusts of wind varied their direction; but the wind continued on the starboard side the whole time, and the ship did not alter her position more than a quarter of the circle. It was quite clear, from the peculiar manner in which the rain (if such large drops can be so designated) fell, that we were within the vortex of the spout, and that the gusts which laid the vessel on her side were part of the phenomenon, and consequently that the gyration must have been as I have stated. I have observed many waterspouts between the tropics, but, with the exception of that off Clermont Tonnerre, never noticed the direction in which they turned, and regret that the subject was never before mentioned to me, as I have had many opportunities of determining the fact.

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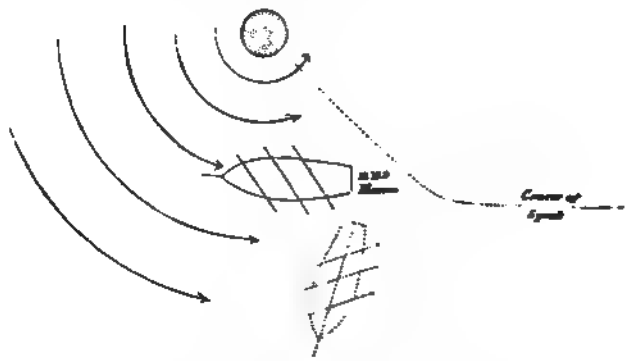
Diagram to explain the foregoing Remarks.

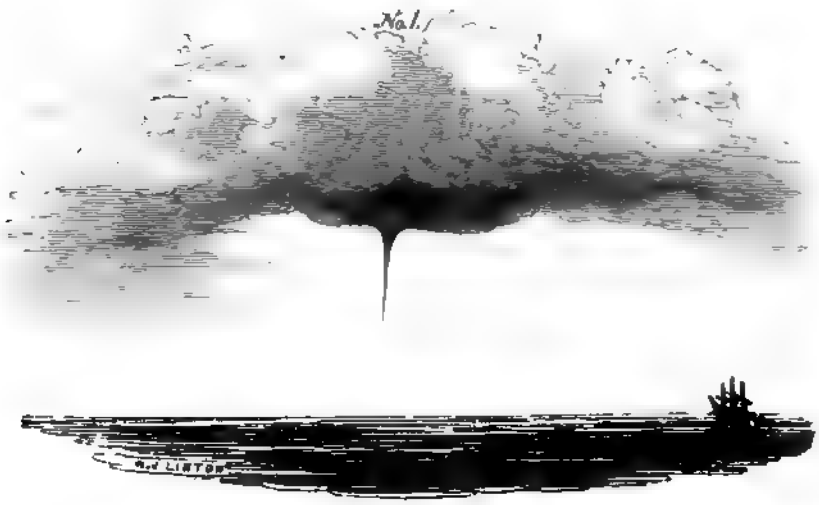


The *arrows* denote the direction of the wind.
The *dotted ground-plan*, the ship broken off her course.

Another water-spout.

"As it appears to me that any observations upon this extraordinary phenomenon will be interesting, I extract from my journal a few lines, which I wrote when I last crossed the equator :—

"'The day had been very sultry, and in the afternoon a long arch of heavy cumuli and nimbi rose slowly above the southern horizon. while watching its movement, a waterspout began to form at a spot on the under side of the arch, that was darker than the rest of the line. A thin cone (Sketch No. 1)



first appeared, which gradually became elongated, and was shortly joined with several others, which went on increasing in length and bulk until the columns had reached about half down to the horizon. They here united and formed one immense dark-coloured tube. The sea beneath had been hitherto undisturbed; but when the columns united it became perceptibly agitated, and almost immediately became whirled in the air with a rapid gyration, and formed a vast basin, from the centre of

which the gradually-lengthening column seemed to drink fresh supplies of water (Sketch No. 2). The column had extended about two-thirds of the way toward the sea, and nearly con-

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nected itself with the basin, when a heavy shower of rain fell from the right of the arch, at a short distance from the spout, and shortly after another fell from the opposite side. This discharge appeared to have an effect upon the waterspout, which now began to retire. The sea, on the contrary, was perceptibly more agitated, and for several minutes the basin continued to increase in size, although the column was considerably diminished (Sketch No. 3). In a few minutes more, the column had entirely disappeared; the sea, however, still continued agitated, and did not subside for three minutes after all disturbing causes from above had vanished.

"'This phenomenon was accompanied by thunder or lightning, although the showers of rain, which fell so suddenly, seemed to be occasioned by some such disturbance.'

"Two days afterwards we got the south-east trade wind, in lat. 0° 33′ S., long. 21° 40′ W.

"The waterspouts were seen in 20′ N., and 22° W.

(Signed) "W. J. BEECHEY."

The circular motion imparted to the water of the sea during waterspouts, is probably not confined merely to the surface, for the ocean, to an unknown depth, may partake of the impulse.

In 1815, the Orontes frigate, commanded by Captain Cochrane, was in company with the Newcastle, the flag-ship of the late Admiral Sir Pulteney Malcolm. The ships were near the equator, between Teneriffe and St. Helena, when two large waterspouts were observed a-head of the Orontes, one on each bow, about a mile and a half distant, whilst the Newcastle was nearly the same distance on the larboard-beam.

It was perfectly calm at the time: yet the Orontes was observed to be going a-head of the Admiral; and it was proved, by throwing paper into the sea, that the vessel was making no way through the water. The officers were of opinion that the Orontes was carried forward by a partial current, which did not affect the

Newcastle; and the circumstance was mentioned to the Admiral, by Captain Cochrane, on their arrival at St. Helena, as a curious coincidence, viz., the Orontes being carried forward, whilst the waterspouts were a-head of her.

Observations on a Whirlwind or Waterspout in my passage from Demerara to Barbados, on the 24th August, 1836, in lat. 9° N., and long. 58° W.

"HAMILTON, 19th July, 1839.—The early part of the day was sultry and calm, with occasional heavy squalls of rain and wind, such as are common at that season of the year in tropical climates. At about two o'clock in the afternoon (a gentle breeze having sprung up) we observed a waterspout to windward of us. Phenomena of that description being very common in this quarter, it excited no particular attention, until it was seen approaching the vessel with considerable velocity, and in a direction so likely to come in contact with her, that it became necessary to clew up all sail and put the vessel before the wind, in order that, sailing in a line parallel with the line of motion of the meteor, we might keep out of the range of its gyration. We were obliged to continue in company with it in this way for twenty minutes or half an hour; and I had an opportunity of satisfying myself that its progressive motion was in the direction, and of course with the velocity, of the general current of air, and that its rotatory motion, supposing the point of commencement to be the east, revolved towards the south. The water was raised up like water boiling in a pot to the height of two feet or more; and the spray, by the centrifugal action, to a much greater altitude. I would also remark that, although when at a distance the conical spiral-shaped cloud, indicating the existence of waterspouts, was perfectly apparent, yet on the approach of the meteor it entirely disappeared; nor did it again show itself after passing to leeward of us.

(Signed) "W. BURGESS.

"To Lieutenant-Colonel Reid.

"P.S. The waterspout, when at its nearest point to us, must have been within a hundred yards, and I judged it to have a diameter of about twenty to thirty feet."

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Moving columns of sand.

The moving pillars of sand described by Bruce as having been seen in Nubia, though the account may be familiar to many, is here reprinted, because these moving pillars probably originated from the same cause, whatever that may be.

"On the 14th of November, at 7 in the morning, we left Assa Nagga, our course being due north; at 1 o'clock we alighted among acacia trees at Waadi el Halboub, having gone twenty-one miles. We were here at once surprised and terrified, by truly one of the most magnificent sights in the world. In that vast expanse of desert, from west and to north-west of us, we saw a large number of pillars of sand at different distances, at times moving with great celerity, at others stalking on with a majestic slowness; at intervals we thought they were coming in a very few minutes to overwhelm us; and small quantities of sand did actually more than once reach us. Again they would retreat, so as to be almost out of sight, their tops reaching to the very clouds. Then the tops often separated from the bodies; and these once disjoined, dispersed in the air, and did not appear more. Sometimes they were broken near the middle, as if struck with a large cannon shot. About noon they began to advance with considerable swiftness upon us, the wind being very strong at north. Eleven of them ranged alongside of us, about the distance of three miles. The greatest diameter of the largest appeared to me, at that distance, as if it would measure ten feet. They retired from us with a wind at south-east, leaving an impression upon my mind to which I can give no name, though surely one ingredient in it was fear, and a considerable deal of wonder and astonishment. It was in vain to think of flying: the swiftest horse, or fastest sailing ship, would have been of no use to have carried us out of the danger.

"15th Nov. At 7 A.M. we left Waadi Dimokea. The same appearance of moving pillars of sand presented themselves to us this day, in form and disposition like those we had seen at Waadi el Halboub, only they seemed to be more in number and less in size."

These moving pillars of sand are not confined to Africa. They may be seen in every quarter of the

globe. They are thus alluded to by Captain Lyons, in his work, entitled "Residence and Tour of the Republic of Mexico," p. 196:—

"From San Luis Potosi to Zalatecas.—Our whole journey on this day was over an excellent, though dusty road, through a desert, only enlivened by the numerous spiral whirlwinds, which half buried us at times beneath the cloud they created."

Page 157, "Journey in Protillas":—

"In three leagues over a stony road, we reached the Raneo del Tejou, and passed on to a plain, on which the number of whirlwinds was quite extraordinary. We had repeatedly seen a few of them; but on this day they appeared to have assumed a new form, raising the dust to a height of 200 or 300 feet in straight columns, which preserved their perpendicularity and moved but slowly over the plain, while many continued to turn rapidly on their axis, without any perceptible progressive motion."

The same phenomenon is constantly observed in India: and the following extract is descriptive of some small whirlwinds seen at Deesa. These whirlwinds are usually termed "Devils" in India.

Extract from a letter from Lieutenant Fyers, 40th regiment, dated Deesa, Bombay Presidency, 1838.

"The sand is so loose here in many parts, that the Devils take it up to a great height, and in such quantities that it has almost the appearance of an immense pillar of about eighteen feet in diameter, and some hundred in altitude; this goes travelling along in no very straight course. When it comes to any loose bushes cut for hedges, it takes and twirls them up, a good number of feet, like a corkscrew. Up high, the pillar loses itself in a cloud of sand, which is carried along by the current of air, but which appears to have lost the revolving power.

(Signed) "WILLIAM FYERS."

The sudden storm which sunk the steam-boat Tigris on the River Euphrates, on the 21st May,

CHAP. XI. 1836, in some respect bears a resemblance to the waterspout and the moving columns of sand just described.

A memorandum, written by Mr. Ainsworth, who kept the meteorological journal of the expedition, states,—

"It was a fine afternoon, only a few clouds, cumulo and cirro-strati, in the horizon; a light breeze from the east-north-east; the sun about two hours past the meridian, when a dense black cloud was first observed moving across the wilderness from the west-south-west, and in the teeth of the wind. As it approached, it was found to consist, in its base, of red-coloured masses of dust, which succeeded one another rapidly, breasting the wind in their onward progress, and *rising till they were received into the bosom of an overhanging cloud, from which these columns of dust were again precipitated with great force and rapidity, accompanied with a violent rain.*

"During the storm the barometer fell upwards of two-tenths of an inch, which is a very large amount in a climate where the average diurnal oscillation did not at that time amount to 05——. Immediately after the storm had passed by, the weather resumed its previous tranquillity; nimbi, or large clouds in the horizon.

(Signed) "W. AINSWORTH."

A written account by Captain Lynch states,—

"Light blue clouds, with sheet lightning, had been observed above the western and west-north-western horizon, between the hours of noon and three P.M., for two days previous to the storm. On the 21st, a little after noon, the clouds in the west-north-west assumed a dense appearance, and the breeze that had blown lightly from the northward, a little westerly, during the morning, drew gradually round to that point, and freshened about one P.M. sufficiently to induce the officer on deck to furl the awnings of the Tigris; ere this operation (the work of a few minutes) was performed, the clouds were drawn down in contact with the horizon, inducing the commander of the Tigris to warn Colonel Chesney, who happened to be on board, of the probability of a squall; and endeavoured to make both vessels (the Euphrates was in company) fast to the bank during its expected

passage. Almost as soon as the cloud touched the horizon, a point of it a little to the left of its centre, as seen from us, was disturbed and enlightened, until cracked by fine white lines, which I recollect remarking at the time resembled a lace veil thrown against the cloud; this advanced rapidly, preceded by numerous little whirlwinds, gyrating *contrary* to 'the direction of the hands of a watch.' The gyrations of the main shaft could not be seen, even if my attention had been drawn to it, as the clouds of sand that preceded it rendered its motions invisible. About three minutes after the appearance of the veil, the vessel was unable, from the force of the wind, to keep her head to it with full force of steam, and in another she was whirling in it, contrary to 'the direction of the hands of a watch.' A minute of noise and horror, in which sand sparks (probably from the galley) and large drops from the clouds, were soon mingled with foam and wreck from the river, and the Tigris went down in silence—head south, or right down the river; having gone round by the westward, or against the storm point. Her head being north-westward, the wind on her larboard bow. Head westward, wind on the starboard bow. South-westward, on the starboard beam; larboard side under water. South, wind on starboard quarter as she sunk.

(Signed) "H. BLOSSE LYNCH."

Having read an account in the "Times" newspaper of whirlwinds (similar to those so often described by Mr. Luke Howard), as having been seen near Lincoln, as well as Manchester, on the same day, I wrote to the persons named in the paragraph.

The answers which have been received deserve attention, and are inserted, as well as the paragraphs which led to the inquiry.

"EFFECT OF A WHIRLWIND.—That phenomenon, which is known by this familiar name, was witnessed with great attention, and no small cause of apprehension, on Wednesday last, by Mr. John Prestwood, of Branston, near this city, whose minute description we state almost in his own words. About a quarter before 3, just preceding the storm, a whirl of air was

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seen to approach from the east, and to become a vast column about 80 yards in height, and as large round as a hay-stack that should have about 15 tons of hay in it. It approached the field slowly where Mr. Prestwood and his men were hay-making, and took up the hay in a spiral ascent to a vast height, carrying it to a great distance, going off across the adjoining fields. In about ten minutes or a quarter of an hour another great tornado was seen to approach out of the same quarter, proceeding in the same route as the other; but it took across a fallow piece, about 60 yards from Prestwood's house. It made a turn to the right, and then along the fallow field; there then occurred a sight most wonderful, for it tore up the earth, and raised it to a great height in a black mass that seemed to be full of fire, with thunder and lightning out of the midst of it; the noise and crackling were hideous and appalling. It missed the house by a few yards; and Prestwood believes that if it had passed over it the whole would have been carried away. The corner of an out-house, and nearly a ton weight of newly-cut thorns, were taken along with it and scattered in all directions. It did not go faster than a horse could keep up with it. Its course then went whirling and curving towards Canwick. The cattle that beheld it fled about in order to avoid the danger; and such was its force, that anything that lay in its way must have been destroyed."—*Lincoln Gazette.*

"EXTRAORDINARY WHIRLWIND.—About 12 o'clock at noon, on Wednesday, a very extraordinary whirlwind took place at Hopwood, about one mile from Middleton, in a field at Higher-fold, belonging to Mr. Joseph Howarth, a farmer. A large oak tree was torn up by the roots, another was blown down in Hopwood Clough, and boughs torn from off trees were seen flying in the air for nearly five minutes. The spouts from two cottages in Blomerly Clough, and the slating from an engine-house near, were torn off. The men in Hopwood Clough Colliery, upwards of 300 yards under ground, were seriously alarmed, describing the noise to be the same as if an engine had burst: people for the distance of a mile and upwards could hear it. What makes the affair more strange is, that the breadth the whirlwind took was only about 20 yards. A man's pair of breeches were carried off the coal-hill at Hopwood Colliery, and found in a sheep pasture about 400 yards off. There was not much rain, but there were many brilliant flashes of lightning and heavy claps of thunder during the afternoon."—*Manchester Guardian.*

(From the *Times* of July 11, 1838.)

Mr. Prestwood having carried the letter he received from me to the editor of the "Lincoln Gazette," the following is the additional declaration taken down by the editor; and in recording which, he stated he was desirous of being exact.

"Lincoln, 12th July, 1838.

"According to John Prestwood's declaration, and that of his wife, and Dennis Brodwell, their man-servant, the *first* column was not seen to revolve on its own centre. It might do so; but that escaped their observation. It went something like 'a rushing wind, a tearing wind;' but would not say it turned round as a top does when it is set spinning. The *second* was seen distinctly to whirl round in that manner, and in the direction that the hands of a watch go.

"The first was seen ¼ before 3 in the afternoon. It came from out of the east, inclined southward in curves, following the sun then to westward, and must have been inclining towards the northward afterwards. Canwick is four miles north-west from Branston. Both places are south-east from the city of Lincoln a few miles.—(See Ordnance map.) The first column, after passing Prestwood's, was (according to hearsay) seen at Canwick fields (still inclining to *north*-west), and went over a farmer's yard near the spot called Sweepwash in the map. In the two fields off this point, a ball of fire was seen to fall by three men, and it made a great hole, the stony soil being scattered around as if a large cart-load had been cast out in all directions. This was caused, it is supposed, by the first column. This column then made a detour more northward across the river Witham, which it momentarily dried for 50 to 100 yards, and made great devastation on the opposite side to where Prestwood first saw it, at Greetwell especially.

"There was much lightning in all directions at the time this was occurring, and heavy rain followed, with much hail of large size; but no water was seen in the columns, and he does not suppose they contained any. 'They seemed to be full of thunder, lightning, and earth, all mixed together.'

(Signed) "E. B. DRURY.

"Gazette Office, Lincoln."

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Extract from a report, dated Middleton, Aug. 8, 1838, relative to a whirlwind which occurred on the 4th July, 1838:—

"1. The wind went round in the same manner as the hands of a watch.

"2. There was a cloud over it at the time, and it appeared to be much disturbed.

"3. It came from the south-east, went about a mile and a half, and was about twenty yards in breadth.

(Signed) "JOSEPH FIELDING.

"Middleton, near Manchester." "Reporter.

I have also received from Mr. Fielding the following statement, which was published in several newspapers.

"EXTRAORDINARY WHIRLWIND.—At six o'clock on Monday evening last, 6th of August, 1838, a most extraordinary whirlwind took place in a field belonging to Mr. George Wolstencroft, of Little Green Mill, near Middleton. It tore a large willow tree up by the roots, which measured upwards of twelve feet in circumference, it was also split up the middle; and very large boughs were torn off other trees and carried upwards of a mile. They turned round in the air in the same direction as the hand of a clock or a watch, and made a noise which was heard upwards of a mile distant. A great number of apples were blown off the trees, and some were blown through the windows of several houses. The clouds appeared very much disturbed at the time, and there was a smart shower of rain which lasted about five minutes. Thousands, for miles round, have been to look at the above tree.

"On Monday night last, there was a very heavy fall of rain and hail at Oldham and the neighbourhood, accompanied by much thunder and lightning. The rivers became much swollen, and many houses were flooded. There was a violent wind during the rain and hail, which tore many boughs off the trees, and did a deal of damage to fruit. A child four years of age, at Coldhurst Lane Colliery, was struck with the electric fluid. At Ashton-under-Lyne, a boy ten years of age, son of Mr. John Neild, who keeps a beer-shop, fell into the river, and was washed away; he was not found on Wednesday evening, although great exertions had been made."

A record of the state of the weather, and of meteorological phenomena, is now ordered to be kept at the central signal station in the Bermuda Islands; and weekly reports from this record are to be published in the "Bermuda Royal Gazette." The following is an extract from one of these reports.

Report relative to a Waterspout, seen from Fort George, Bermuda.

"May 13th, 1839.

"I observed on the morning of the 17th ult., about six A.M., a waterspout, bearing from Fort George south-west. When first seen it appeared very small, and travelled in an easterly direction; when bearing south-east it vanished for a minute or two: when it was again seen it gradually became larger, and was of a pale red colour, although the sun was not shining. It was about twelve miles distant from the land, and it lasted for fifteen minutes. I am unable to state which direction it turned round.

(Signed) "LUKE HEDDERLEY,
"Sergeant 30th Regiment, S. Director."

(Bermuda Royal Gazette.)

Whirlpillars revolving in different ways.

On the 15th of August, 1839, I had an opportunity of observing the mode of revolving of a waterspout. It formed under Government-House at Bermuda, which stands about 130 feet above the level of the sea.

A heavy cloud, from which rain was falling, and from which the waterspout projected, moved slowly towards the shore, and to within 1000 yards of the spectators, who were to the southward of it. The mode of revolving could not be ascertained by the naked eye; but on looking down through a telescope upon the lower part of the phenomenon, it appeared like a cylinder formed of spray from the sea. The height

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seemed about fifteen feet. On the south side, nearest the spectators, the spray was seen distinctly to fly from the right hand towards the left with somewhat of a spiral motion: whilst over the top of it a small portion of the opposite side was seen returning from the left hand towards the right, completing the revolution in the same manner as the hands of a watch revolve. The upper part was alternately condensed into visible vapour, and re-dissolved in a remarkably sudden manner several times. Whilst contemplating this phenomenon, it was not easy to refuse belief that it owed its origin to some fixed cause.

I am indebted to Mr. Walker, the Queen's Harbour Master at Plymouth, for an account of a waterspout he sailed through in the Bay of Naples; which, by his statement, revolved in a contrary way to the one just described. Mr. Walker says, "I have been through a waterspout in the Bay of Naples, and can safely state that its rotations were not in accordance with the law we have been discussing — namely, on its south side the wind was *westerly*, and on its north side *easterly*."

On the 28th of August, 1839, I witnessed another at Bermuda, which likewise seemed to revolve in the contrary direction to the hands of a watch; but it was not sufficiently developed, and was too distant to be certain of the fact, though attentively watched with a telescope.

On the Fall of Fishes upon Land.

Minute fishes said to fall during rain.

The description of waterspouts carrying up the water of the sea into the air, together with the reported rains of salt water during hurricanes, led me

to inquire into the singular accounts of minute fish being seen in India on the land, both alive and dead, after heavy rain, and which are there believed by most persons to fall from the clouds. I thought it possible, since whirlwinds on land carry up branches of trees, and whirlwinds at sea carry up the water of the ocean, such phenomena might have the power of raising pools of water, and all small bodies floating in them. This inquiry led to a very curious paper being written on the subject by Captain W. C. Grant, of the Bombay Engineers, and which will be found subjoined; and it will be found that Captain Grant also alludes to the moving pillars of sand.

He had never, however, observed which way these small whirlwinds revolved.

This singular fact of fish being found on the land in India after rain, which is discredited only by those who have not inquired, deserves more close investigation than it has yet received.

I annex the reports I have met with; and if they do not altogether confirm the opinion alluded to above—that fish are carried into the air by the smaller whirlwinds—they will at least, I trust, awaken a desire for further and more attentive inquiry.

I am indebted to Mr. Murray, of Albemarle Street, London, for the following notes by Mr. Yarrell.

Descent of Fishes from the Clouds.

Extracts from a Letter to William Peete, Esq., F.L.S., giving an account of a shower of Fishes in India; with some additional remarks by Mr. Peete.

"The fish (a species of Cyprinus, 2¼ inches long) was copied from a drawing taken by Mrs. Smith, at Monadabad, July 29th, 1829, who speaks of this fish as being one amongst a number

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that came from the clouds in a shower of rain, and was presented to her with many others.

"(The drawing was made by that lady immediately, and coloured from life in every respect, with the exact size of the fish in length and breadth.

"The drawing represents a small species of Cyprinus, 2¼ inches in length, green above, silvery white below, with a broad lateral line of bright red.)

"Mrs. Smith, in a letter from Silpot, in Bengal, when residing there, July 30th, 1836, thus speaks of a similar extraordinary event:—'Have you not heard of its raining fish in India? I can assure you that our men went out and picked them up, during a tremendous storm, on the grass. I saw them myself from the window, leaping about, and the men taking them up. Is it possible the violence of the storm may force them out of the river, or may they be drawn up by the ascent of the foam or vapour, and fall down in the rain? but that many were springing about on the grass, is most true. They were small; the largest I saw was about the size of a small gudgeon.'

"The following lately appeared in a newspaper.

"'SHOWER OF YOUNG HERRINGS.—On the 9th of March, 1830, the inhabitants of the Island of Ula, Argyleshire, after a day of heavy rain, were surprised to find numbers of small herrings strewed over their fields, perfectly fresh, and some of them exhibiting signs of life. Similar instances of showers of small fish are well authenticated.'

"In 'Hasted's History of Kent,' vol. v., page 2, 8vo edition, is the following. 'About Easter, in the year 1666, a pasture field in the parish of Stansted, which is a considerable distance from the sea or any branch of it, and a place where there are no fish ponds, in quantity about a bushel, supposed to have been rained down from a cloud, there having been at that time a great tempest of thunder, hail, wind, &c. These fish were about the size of a man's little finger, some were small whitings, others like sprats, and some smaller like smelts. Several of these fish were shown publicly at Maidstone and Dartford.'

"In a letter from Dr. Latham, he observed, that the circumstance of the shower of fishes is no doubt a fact as recorded in Hasted. I referred, too, to the 'Philosophical Transactions,' vol. xx., page 289, where it is said to have happened at Stansted. I find in this volume of mine a MS. note, dated 1720, by the Rev. Mr. Barrel, which says, that an old servant of his, named

William Martin, mentioned to him, that, when a boy, he lived with his father near where the fish fell, and saw the storm of hail and rain which preceded, and took up several of the fishes.

"Colonel Sykes tells me, that in 'Harriot's Struggles through Life,' there is an account of a shower of fishes that fell in India: the storm overtook some troops on their march, and the living fish fell on the hats of the men.

(Signed) "WILLIAM YARRELL.

"Forwarded with a note."

The next statement was given me by Mr. Buckley, with whom I made a voyage:-

"On March 30th, 1836, at 4 A.M., being in the brig Matilda, of St. John, N.B., off the Bay of Naples, the Island of Ischia bearing east, distant ten leagues. It blowing hard north-west, and thick weather, I observed a very curious appearance in the north-west. It appeared columnar, and like a lighthouse enveloped in a white blaze of fire, and continued so for fifteen or twenty minutes, and then disappeared. Immediately after the wind fell to a moderate breeze, and cleared up, when we had a fine pleasant day.

(Signed) "JAS. BUCKLEY,
"Mate of the barque Barlow."

For the following I am indebted to Mr. Redfield:—

PHENOMENA.—"Recently we have seen accounts of a shower of mud at Buenos Ayres; a shower of chalk at Bennington, Vt.; and a shower of fish at Baton Rouge, La."—*American Newspaper*, 1833.

"Louisville, Kentucky.

"Yesterday morning a great number of small fish were found swimming in the gutters on Jefferson-street. During the night previous a heavy rain fell, and the fish of course descended with the water. We saw a number of them—they were from two to three inches long, and mostly sun perch."—*Louisville Newspaper*, *Nov.* 1835.

The Staunton, Va., *Spectator*, of the 24th ult. says, "During a storm last week (June, 1833), a gentleman of this place, who was

CHAP. II. on one of the roads a few miles from town, distinctly saw a large snake fall from the clouds into the roads, a short distance before him. There was no tree near the spot, and the snake was at a considerable height when he first noticed it. The snake was supposed to be of the water species, and was alive. It was doubtless taken up in a waterspout or whirlwind."

SHOWER OF EELS.—"A friend of ours, yesterday, presented to us a small paper of eels, from one to two inches in length, which he gathered after the heavy rain on Sunday, May 20, 1832, in the neighbourhood of Lafayette-place. They are perfect in form, and attracted the attention of thousands who yesterday called at our office."—*American Newspaper.*

HAIL-STORM.—"A most tremendous and destructive hail-storm passed over the country, about five miles above Trenton, yesterday afternoon, Sunday, May 20, 1832. Windows, poultry, &c. was extensively destroyed."—*Ibid.*

WATERSPOUT, 1832.—"On Thursday, 11th inst., several of the inhabitants of Carver, about eight miles from this place, had an opportunity of witnessing this truly wonderful phenomenon, though, indeed, on not a very extensive scale. We have learned upon inquiry that a whirl in the air was perceived at a little distance from Sampson's Pond. This whirlwind took the direction of the pond: and, at the moment of passing over it, a column of water ascended in one unbroken mass, and to such a height as to be seen at the distance of five miles. A cloud charged with electric fluid was suspended over the pond at the time. In this cloud the top of the column was apparently merged, but in a few moments the whole mass descended into the neighbouring woods, with such force as to break off the limbs of some of the trees with which it came in contact. By this sudden freak of the elements, several frogs became, unintentionally, aëronauts; and, like Vincent Lemanli, paid for their excursion with their lives."—*Plymouth Democrat.*

A SHOWER OF FISHES.—"We have received from a most respectable and credible authority the following narrative:—'There is a farm bordering on Lake Gwynant, in this county, of which Mr. John Rowlands is the tenant, called Hafod Glwyfog.

On last Wednesday fortnight a servant woman was engaged in washing a pail at the edge of the lake, and a number of children were with her. While she was thus employed (the time was about eight o'clock in the evening) she was astonished by a shower of small fishes, which fell upon her and about her, partly into the lake and partly upon the land. They resembled herrings, but were much smaller. The children picked many of them up, and threw them into the lake. A heavy shower of rain had preceded the descent of these fishes, and the day following there was much thunder and very heavy rain indeed.' Our correspondent has preserved the remains of some of these fish in spirits of wine."—*Carnarvon Herald* (*English Paper*, 1833.)

I was informed by Admiral Sir Hugh Pigot that he himself saw a fish fall upon the deck of the Princess Charlotte, in Toulon harbour, when he was on board that ship. A waterspout struck her, and covered her decks with water. No one in the ship doubted but that this fish had been carried up out of the sea by the waterspout, and then fell on the deck. It was somewhat longer than a man's hand.

An account of salmon-fry being found on land at Jedburgh, in Scotland, after very heavy rain, having appeared in the "Scotsman" newspaper, I wrote to the minister of the parish to ascertain the truth of the report, and the following is the answer I received:—

"Jedburgh, 19th Sept. 1838.

"Report said that many salmon-fry were found. I have been able to find only two, and these are still alive. They were found in a pitcher—quite empty and dry—which a woman had set out to receive some of the rain which was falling in torrents. The pitcher was placed beneath a water-conductor, leading down from the roof of a slated house, and the fish must have come down through it. There can be no doubt of the fact of their being found in this, as the woman to whom the pitcher belonged assured me there was not a drop of water in it when set out, and

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nobody approached it to put any thing in. I am sorry that I have been able to get no precise information about the weather on that day, except that it was an absolute deluge of rain. About the period in question a decided waterspout fell in the neighbourhood of the town, and much damaged the fields; but whether it was the same as that in which the fish were found I have not been able to ascertain. I may add, that this place stands on the brink of a small river; in which, however, there are no salmon, and is about two miles distant from a still larger one in which there are many.

(Signed) "JOHN PURVES,
"Minister of Jedburgh."

Having written a second time to Mr. Purves, to know what size the small fishes were, the answer I received is as follows:—

"Jedburgh, 10th Oct., 1838.

"I have waited for some time in replying to your communication of the 29th ultimo, in consequence of some reports in the place of other fishes being found near this on the same day. In so far as my inquiries have gone, they seem mere reports. I have, however, examined the two of which I wrote to you again. They are still alive, and quite lively. As near as I can guess, they are each about an inch in length; a head somewhat large in proportion to the body, which tapers much towards the tail, with clear transparent fins, and a tail very elegantly formed. I have renewed my inquiries about the vessel, which was perfectly dry when set out; as was also the vessel into which the water was subsequently poured, and where they were discovered. On recalling every thing, I can distinctly remember that the day on which they were found was not only very rainy, but rain accompanied every now and then with swirls of wind of terrible power, as often in a thunderstorm—in short, it was quite like a waterspout. (Signed) "JOHN PURVES.

"Lieut.-Colonel Reid."

For the next account I am indebted to Mrs. Kenrick, of Bourne-place, near Canterbury. Lord Eastnor thus writes to her:—

"I have much pleasure in complying with your request, and

stating, to the best of my recollection, the circumstances of the crabs being found near Reigate.

"Soon after a most violent storm of rain and wind,* in the summer of 1829, three small crabs, weighing from $1\frac{1}{4}$ to $1\frac{3}{4}$ oz., were found in the area of the workhouse at Reigate; and a fourth was afterwards found at a little distance, I think the following morning. One of them appeared to be still living. In the morning of the day previous to the storm the area of the workhouse had been thoroughly swept and cleaned; consequently they must have been seen had they been there then. They were found by a boy, who told the governor that he had found a comical sort of a frog. I went myself to the workhouse as soon as I heard of the circumstance, and saw the frogs. I know that Mr. Turner had one of them, for the purpose of preserving it; and you will, probably, hear from him whether he has it still.

"Believe me, &c.,

(Signed) "EASTNOR.

"Tyttenhanger, 5th Aug., 1836.

"To Mrs. Kenrick, Bourne-place, near Canterbury."

Mr. Turner, veterinary surgeon, of Reigate, thus writes on the subject to Mr. Fairholme:—

"SIR, "Reigate, 8th Aug. 1836.

"I beg to acknowledge the receipt of your letter, and shall be most happy to give you the particulars of the crabs, one of which is now in my possession. On the 19th July, 1829, there was a very violent storm, attended with a very heavy rain and hail, the wind being due south.†

"Within the walls of the House of Industry, at Redhill, about one mile and a half from hence, the fall of water was so great as to appear like an inundation. After it had in some degree subsided, the inmates of the house went to open the drains in the yard, to relieve the water, and found four crabs alive and moving, one of which lived several days, and was preserved by me. The others, I fear, were not properly considered, and were ultimately destroyed and lost. The species appears to me to be the cancer pægarus, or common crab, though of small size. It is of a dull

* "This was described to me as having been more like a West Indian hurricane than a European shower."

† Reigate is distant from Brighton, which lies to the south of it, about thirty-five miles.

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brown colour, has two claws and eight legs, four on each side. I have given beneath a rough outline of its size.* A similar circumstance to this occurred seven or eight years ago near this town, and was witnessed by many highly respectable persons. After a severe downfal of rain, the road, and some little space, was positively covered with thousands of toads and frogs, though extremely small, nor larger than a walnut; and many were lodged on the roofs of some of the houses. I shall be happy to show you the crab, as it is in a very perfect state.

(Signed) "EDWARD TURNER."

The next statement is that written by Captain C. W. Grant, Bombay Engineers, before alluded to:—

On the Fact of Small Fish Falling during Rain in India.

"That such is the case is certainly the generally received opinion; and I have met with many officers who profess to have themselves witnessed the fact; that is, that after a heavy fall of rain they have seen small fish jumping about on the terraced roofs of houses, and in other places wholly inaccessible to them, unless they had fallen from the clouds; but I never knew any one who had either caught them in a water-tub or other reservoir, or had known them to fall on his person, as we have a right to expect would have sometimes occurred, if such were the case; or that, in fact, would affirm that he had actually seen them *falling*.

"I have myself frequently noticed little fish flapping about in puddles on the top of a high table land during and after heavy rains; but think their presence in such places, as well as on terraces, may be accounted for without resorting to so improbable an hypothesis as that of falling from the clouds.

"In most parts of India the beds of small rivers, as well as those of the tanks or natural ponds, which are so numerous in the rainy reason, become dry during the hot months, so that the small fish with which they abound must all perish, either from this cause, or by means of the numerous water-fowl and other enemies to which they become an easy prey; so that, unless their spawn had the power of retaining its vitality under very untoward circumstances, it would be difficult to account for their

* The sketch is omitted. The body of the crab in it measured exactly two inches and a half.

reappearance every season in such numbers; and that the spawn has this power there are many reasons for believing: among others, it is even said that some water-fowl, who subsist on this substance during their migrations, void the spawn two or three days afterwards, the eggs retaining their vital functions unimpaired.—(See Lyell's 'Principles of Geology.') It is, therefore, very probable that this spawn may adhere to pieces of stick or grass floating in the tanks or rivers, which on their becoming dry are borne aloft by the small whirlwinds, or *devils* as they are called in India, and thus carried through the air for a considerable distance, and lodged either on the terraces of houses, or on any other apparently inaccessible places (or the spawn may in itself be drifted along, mixed with the sand of the dried-up river-beds): here they are swept by the eddy into the corners, gutters, or other protected spots, where they remain until washed out by the first fall of rain, which frequently lasts for many days. And when we consider how rapidly generation takes place in tropical latitudes, it is easy to suppose these little fish or fry might appear in such unlikely places. The constant heat of the atmosphere, from the time of the drying up of the tanks, &c. (that is during the hot months of April and May), till the first fall of rain, may perhaps account for the spawn or eggs retaining their vitality under such apparently unfavourable circumstances.

"The small whirlwind, or devil, above alluded to, has such power that it frequently unroofs a house, carrying the thatch a great height into the air, as well as pieces of paper, matting, or any light substance; and frequently assumes the appearance of a large and lofty pillar of sand, moving at a steady pace across the plains, sucking every thing of small weight into its vortex, and thus sweeping along for miles, being evidently acted upon by two distinct forces, a spiral motion round its own axis, and a progressive or linear impulse; and might, therefore, possibly draw up these small fish into the air (as has been suggested by some), whence they would fall with the rain: but as these devils occur chiefly, *solely* I believe, in the hot winds or dry season, and never during a fall of rain, such a mode of accounting for their appearance loses its weight; though I admit that these peculiar currents of air may pass over the sea as well as the land, having myself seen the ocean affected in a manner that could only be occasioned by some such cause, namely, the surface drawn up in an irregular conical form to a considerable height, the clouds

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bellying down as it were to meet it, and the whole advancing in a given direction.

"The space between the clouds and the water being very strongly marked, so that it is just possible that a shoal of small fish swimming near the surface might be lifted out of the water by such a cause; but as they have been said to fall in the interior of Hindostan, in places immensely distant from the sea, and at a time when the tanks, &c., are mostly dried up, such an explanation of the fact is beset with difficulties.

"The late Major Hawkins, of the Bombay Engineers, who built and put up the machinery of the Mint at that presidency, told me that he had paid much attention to this subject, but that he had never met with any person who believed in the idea of these fish falling from the clouds who did not, on further inquiry, admit facts that enabled him (Major H.) to account for their presence in a more probable manner; his idea being, that the fish generally contrived to work themselves up to these apparently inaccessible places, such as the terraces of houses, &c., by means of the pipes or gutters by which the water is let off them, or by the angles or corners of the buildings; it being well known that fish have an extraordinary power of surmounting obstacles to their progressive movements, as is evinced by the salmon and other species, particularly the young of eels, who are said to be enabled to climb over the gates of a lock, even when dry, by means of the slime on their bodies.

"Be this as it may, I still think that either this explanation, or that which I have here suggested, is more consistent with our knowledge of nature and her laws, than that these small fish should actually fall from the clouds; though, I believe, we are in a minority on the subject, the fact of their actually falling with the rain being the more generally received opinion.

"Since writing the above, my attention has been called to a paper in the 'Journal of the Asiatic Society' of Bengal, for December, 1833, which bears so directly upon this subject, that I am induced to transcribe it, from an idea that it may not have come under the notice of many of the readers of this work. It is written by James Prinsep, Esq., the editor of the journal in question, and is headed, 'Fall of Fish from the Sky.'

"'The phenomenon of fish falling from the sky in the rainy season, however incredible it may appear, has been attested by such circumstantial evidence, that no reasonable doubt can be

entertained of the fact. I was as incredulous as my neighbours, until I once found a small fish, which had apparently been alive when it fell, in the brass funnel of my pluviameter, at Benares, which stood on an insulated stone pillar, raised five feet above the ground in my garden. I have now before me a note of a similar phenomenon, on a considerable scale, which happened at Nakulhatty Factory, Zillah Decca Jelalpoor, in 1830.

"'Mr. Cameron, who communicated the fact, took the precaution of having a regular deposition of the evidence of several natives, who had witnessed the fall, made in Bengalee, and attested before a magistrate: the statement is well worthy of preservation in a journal of science, I therefore make no apology for introducing a translation at length. The shower of fish took place on the 9th February, 1830, in the neighbourhood of the Surbundy Factory, Feridpoor.

'JAMES PRINSEP.'

"The depositions of eight or ten people here follow, of which I shall merely give extracts.

"Shekh Chandhari Ahmed relates in his deposition, 'I had been doing my work at a meadow, when I perceived at the hour of 12 o'clock the sky gather clouds, and it began to rain slightly, then a large fish, touching my back by its head, fell to the ground. Being surprised, I looked about, and behold a number of fish likewise fell from heaven! They were *saul*, *sale*, *yugal*, *mingal*, and *badul*. I took ten or eleven fish in number, and I saw many other persons take many. I looked at heaven, and I saw like a flock of birds flying up, but there my perceptions were not clear enough: amongst these fish many were found rotten, without heads, and others fresh and perfect; and amongst the number which I had got, five were fresh, and the rest stinking and headless.'

"Shekh Punikulloh, twelve years of age, declared, 'While I was sitting in my own house, I perceived a number of fish fall from the sky, some of them on the roof of my own cottage, one of them was large, about *one cubit*, and *three seer (lb.) in weight*.'

"Another man says, 'I perceived a baduli fish, large, about *one cubit*, fall before me from the sky, after which I went further and found another.'

"Another says, 'I observed a *mingal*, and some other fish, *badulis*, &c. of different sizes, fall from the sky; I picked up about five or six of them to satify my curiosity, but did not eat them at all.'

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"Another man deposed, 'I found every part of my hut scattered with fish; they were *baduli*, *mingal*, and *nauchi*, and amounted to twenty-five in number.'

"Again, 'some were fresh, but others rotten and without heads.'

"All accounts agree as to the time, 12 o'clock, and as to the description of fish.

"With regard to the small fish that Mr. Prinsep found in his pluviameter, I think its presence is as likely to have been occasioned by either of the causes before mentioned, as that it fell from the clouds; but with respect to the circumstantial account of the fall of fish in the neighbourhood of Feridpoor, I have nothing to say. When we read of fish, a *cubit in length* and *three pounds in weight*, falling from the sky, some fresh, others putrid, and without their heads, our reason is at fault, unless we suppose them to have been thrown up by some volcanic or gaseous eruption, such as is, I believe, mentioned by Humboldt as having occurred in South America: but it is quite evident that such a phenomenon can have no connexion with the fact of small fish commonly falling during rain in India; though I beg to state, that my suggestions as to the cause of their appearance in apparently inaccessible spots are offered with the greatest diffidence, having been induced to give them solely with the hope of exciting discussion and information on this certainly interesting fact; as, before we can arrive at a proper understanding of the subject, it would be necessary to learn from repeated observations, whether the fish that fall are of fresh water or marine species, and whether they are full grown specimens of a small class, or the fry of larger kinds; what the direction of the wind was at the time of their falling, as well as any peculiarity of the atmosphere as denoted by the barometer or thermometer, and other minutiæ that will naturally occur—my aim in writing these few remarks being chiefly to detail the effects of those small whirlwinds called devils, that sweep across the Indian plains, and to show that they may be considered as models of those mighty hurricanes, that it has been the object of the foregoing paper* to describe.

"C. W. GRANT,
Captain, Bombay Engineers.

"March, 1838."

* This alludes to the original article on Hurricanes, printed in the Professional Papers of the Corps of Royal Engineers.

The next account of the fall of fish in India, is copied from the "Asiatic Journal" of January, 1839, page 78, and taken by that journal from the "Calcutta Courier" of the 24th Sept., without naming the year.

"We have the following account of an extraordinary fall of fish, from a correspondent of undoubted veracity, who witnessed the occurrence himself at a place not more than twenty miles south of Calcutta, in the Sunderbunds, by way of the Salt Water Lakes:—'About 2 o'clock, P.M., of the 20th instant (probably 20th September, 1838), we had a very smart shower of rain, and with it there descended a quantity of live fish, about three inches in length, and all of one kind only. They fell in a straight line on the road from my house to the tank, which is about forty or fifty yards distant. Those which fell on the hard ground, were as a matter of course, killed from the fall, but those which fell where there was grass growing, sustained no injury, and I picked up a large quantity of them 'alive and kicking,' and let them go into my tank. Some people suppose phenomena of this nature take place through the agency of waterspouts, which draw up the fish, &c., from rivers and tanks, and afterwards return them to the earth again in showers of rain; and there appears to me no other way of accounting for the occurrence of the phenomena, or that fish should be found so far out of their element. The most strange thing that struck me, in connexion with this event was, that the fish did not fall *helter skelter*, everywhere, or 'here and there;' but they fell in a straight line, not more than a cubit in breadth. The natives living in and about the place gave to the fish the name of *uka;* but whether this be the right word or not, I cannot tell from my own knowledge."

When such a phenomenon as this occurs a few fishes should be preserved; which is easily done by putting them into any common spirit, so that they may be sent to persons competent to determine their genus and species.

CHAPTER XII.

THE CONCLUDING CHAPTER.

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THE vast quantity of electricity rendered active during hurricanes, and the appearances accompanying water-spouts, lead insensibly to the consideration whether this can be the agent which causes great storms. It was impossible, while arranging the matter here detailed, to avoid speculations on the subject; and these speculations assumed a character of great interest, when satisfactory proof was obtained that great storms in the southern hemisphere revolve in the opposite direction to those of the northern; and the two poles of the magnet, when in conjunction with a voltaic battery, were seen to exhibit a similar phenomenon. But being desirous, throughout this investigation into storms, of avoiding mere hypothesis, I state this only as a remarkable coincidence.

With the view of trying if rotations could be exhibited off the poles, a 10-inch hollow shot was obtained from the Board of Ordnance, and converted into one of Barlow's magnetic globes, and placed in the hands of Mr. Clarke, of the Lowther Arcade, London. It was left to his ability to prepare it for experiments as he might judge best.

A broad belt was turned on this 84 lbs. shot, in the lathe for turning cannon at Woolwich, equal to the relative width between the tropics; and this space was

covered with coils of copper wire, as in Mr. Barlow's globes. A small iron cylinder was then inserted in that part of the globe which corresponds to the latitude of Great Britain; and a small coil of another wire passed round this cylinder to create a disturbance in the electric currents of this artificial globe. Then, when both coils were placed in communication with the exciting battery, and another voltaic current was passed through the wire which was designed to move in circles, and was put in proper connection with it, a rotation immediately commenced, changing its mode of revolving as the upper wire was changed from the copper to the zinc.

There are squalls within the limits of the trade-winds which evidently are not of the nature of rotatory storms. From explanations received from naval officers, as well as from some log-books, I should be convinced that the tornadoes on the west coast of Africa, as well as the pamperos on the coast of South America, and also arched squalls, are phenomena altogether different from the whirlwind; but the evidence has not proved reconcileable. Thus, in the log-book of H.M.S. Tartar, is to be found that which follows:—

Extract from Log of H.M.S. Tartar, on the West Coast of Africa.

Hour.	Courses.	Winds.	Remarks.
			April 3, 1821. At single anchor in the north-west bay of Fernando Po.
Noon	.....	Light breezes	Noon. Light breezes.
P.M.	.....		P.M. Ditto weather.
4			At 4, completed watering 110 tuns; in launch.

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Extract from Log of H. M. S. TARTAR—*concluded.*

Hour.	Courses.	Winds.	Remarks.
8	.....	Light breezes	At 8, light breezes; threatening in the *north-east*, indicating a tornado.
12			Midnight. Came on a tornado; *veered round the compass.*
			April 4, 1821.
A.M. 4	.....	Calm	A.M. Tornado still continues. At 4, calm, with thunder and lightning; sent a boat to haul the seine, &c.
			April 30, 1821.
P.M. 7.35			P.M. At 7.35, came-to, with small bower; Cape Coast Castle N ½ E; moderate and cloudy.
10			At 10, heavy rain.
11	.....	N E	At 11, a tornado from the *north-east.*
			May 1, 1821.
P.M. 3	.....	S E	P.M. At 3, came on a heavy tornado from the *south-east.*
			May 7, 1821.
P.M. 1.30	.....	E N E	P.M. At 1.30, came on a heavy tornado from east-north-east; split the jib.
			June 2, 1821.
P.M. 2.30	.....	Eastward	P.M. At 2.30, a heavy tornado from the *eastward.*

The four last examples accord with what I have been told by naval men, viz., that during the violence of the tornadoes the wind blows always from the eastward. This part of the subject, therefore, requires more attentive observation. If seamen would make their log-books records of the weather, noting remarkable meteorological phenomena as they occur, they could furnish hourly observations over a vast extent. This is the advantage offered by the present inquiry; for, by means of the log-books of ships, hourly observations over extended tracks have really been obtained.

Depth of Water in Anchorages during Hurricanes.

An anchorage, which would be of sufficient depth in ordinary gales, might prove too shallow during a hurricane, in consequence of the depth of the trough of the sea from the unusual undulations created by such storms. Instances have been here given, when the effect of hurricanes, blowing into a bay, has been to heap up the water within it for a time; so that vessels which have dragged their anchors during such a crisis, have been carried into places whence they could not float after the storm had passed over.

The opposite consequence may also occur: such as happened to the Lark surveying schooner, when at anchor off the west coast of Andros Island, in the Bahamas. "Owing to the receding water, that vessel struck heavily from 6 to 8 P.M. on the 6th of Sept., 1838; but floated again on her being raised by the south-east gale; whilst the wrecking schooner Favourite, 68 miles north of the Lark, was left completely dry."*

The Barometer.

To Mr. Redfield (as far as I know) we are indebted for the first true explanation of the cause of the rise and fall of the barometer. In a communication, lately received from him, he has informed me, that the barometer stands somewhat higher than ordinary just beyond the verge of a storm. Thus, when the hurricane of the middle of August 1837 (Chart VII.), was passing, he observed that the barometer at New York

* Lieut. Smith's Report, Nautical Magazine for January, 1839, p. 30.

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was considerably above 30 inches. Captain Leith's position in the Bahama Channel, in the Seringapatam frigate, will be found engraved on the same Chart; and I here add an extract from her log-book, which appears to confirm Mr. Redfield's remark. The barometer of the Seringapatam stood above thirty inches on the day the Calypso was upset, not very far from her; and it fell to 29.6 as the ship stood to the southward, and the storm went off towards the north.

Extract from the Log of H.M.S. SERINGAPATAM, on her Voyage between Nassau, New Providence, and Havannah, in Aug. 1837.

Hour.	Wind.	Bar.	Remarks.
			August 15, 1837.
A.M.	North and N by E	30.2	A.M. Moderate and fine weather. Lat. 25° 25′ N, long. 77° 28′ W.
			August 16, 1837.
A.M.	N W by N	30.0	A.M. Fresh breezes and cloudy; sent top-gallant-masts on deck, &c.
			August 17, 1837.
A.M.	W N W	30.2	A.M. First part; fresh breezes and hazy; latter part, moderate and fine.
			August 18, 1837.
A.M.	.....	29.6	A.M. Moderate and fine; wind variable.

Unfortunately, the barometer is supposed to foretell bad weather, whereas it only indicates that a physical change in the atmosphere has actually occurred; but this may be the beginning of a storm: from what has just been stated, it will be understood that to mark the words "*set fair*," usually marked on barometers, is to bring this valuable instrument into disrepute, and instrument-makers should leave off the practice.*

* Whatever Mr. Redfield has written on Meteorology deserves to be read with attention. The following list of what he has published is taken from a paper of his own in the English Nautical Magazine for January, 1839.

The gusts and squalls in the midst of the storms are features of great interest, towards which attention was suggested in the first chapter of this inquiry. These phenomena explain Mr. Daniell's observations, in the paper published in the "Philosophical Transactions of 1832," on the *Water Barometer* of the Royal Society, constructed by himself. Mr. Daniell says,—

Water Barometer of the Royal Society.

"It is extremely curious to watch its action in windy weather; the column of water appears to be in perpetual motion, resembling the slow action of respiration. During a gale of wind, on the 16th of November, 1830, I made the following observations:—

Time.	Thermometer.		Water Barometer in Inches.	Mercurial Barometer in Inches.
	Internal.	External.		
h. m.	°	°		
2 30	56	55.5	387.87	29.092
2 45	....	....	387.59	29.090
3 0	....	....	387.44	29.090
3 15	....	....	387.28	29.090
4 0	....	....	387.64	29.090
4 15	....	....	387.85	29.090

"About half-past two, the maximum range of the oscillations was about 0.28 of an inch; about half an hour later, one gust of wind caused an oscillation of 0.43 of an inch; and the minor oscillations were generally nearer the lower than the higher extreme. At

"Silliman's Journal for April, 1831, Vol. xx. p. 17—51. See also Vol. xx. p. 191—193; Blunt's Am. Coast Pilot, 12th Edition, July, 1833, p. 626—629; Silliman's Journal, vol. xxv. p. 114—135; vol. xxviii. p. 310—318; xxxi. p. 115—130; xxxiii. p. 50—65 and 261—265; Jour. Franklin Inst. vol. xix. Feb. 1837, p. 112—127; Am. Coast Pilot, 13th Edition; Jamieson's Edinburgh Journal, Feb.—April, 1838."

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four o'clock the movement became sensibly less in extent, and the mean point of the oscillation began to rise, and, as I ventured to predict, the wind very soon began to abate. It became very suddenly calm, and the next day was very fine."

Mr. Daniell next states, that the water barometer precedes the mercurial barometer, in its indications, by one hour. The fact probably is, that the water barometer being more than thirty feet high, shows us those small changes which the mercurial barometer, only about three feet high, does not record. The true value of the sympiesometer is its approach to the delicacy of the water barometer. The latter instrument is now out of order; but Mr. Daniell concludes his paper by stating, that should the Council of the Royal Society hereafter come to the conclusion that there is enough of interest in the subject to induce them to prosecute it further, he is of opinion that the instrument may be reboiled and resealed, without much risk. If it were only for the purpose of showing us something more of the nature of gusts and squalls, it would be very desirable to restore this fine instrument to its efficient state.

If further reasons still were wanting to show the importance of frequently observing and recording the variations of the barometer and sympiesometer whilst at sea, they might be supplied from a statement received from Mr. George Hepburn, master of the barque Felicity, of Greenock. (See the first part of the hurricane on Chart VII.) On the morning of the 13th of August, 1837, he found the sympiesometer down at 28.50 inches, with the ship at the time under sky-sails and studding-sails. Hurrying on deck he furled all

small sails, and close-reefed the topsails and foresail. At the commencement of the storm, the sky was black in the north-west. By two P.M. all sails were furled, and the royal and top-gallant-yards and masts on deck, for the gale had increased to a hurricane; the wind then south-west, and the ship frequently lurching the lee-rail under water. At 7.30 P.M., there was less wind, and it was veering to the southward, having commenced about north-west.

It has frequently been observed that the barometer begins to rise a little before the most violent part of a hurricane takes place. It will probably be found that the upper part of this phenomenon moves onward before the portion nearest the earth's surface, and that this is the cause of the effect here observed.

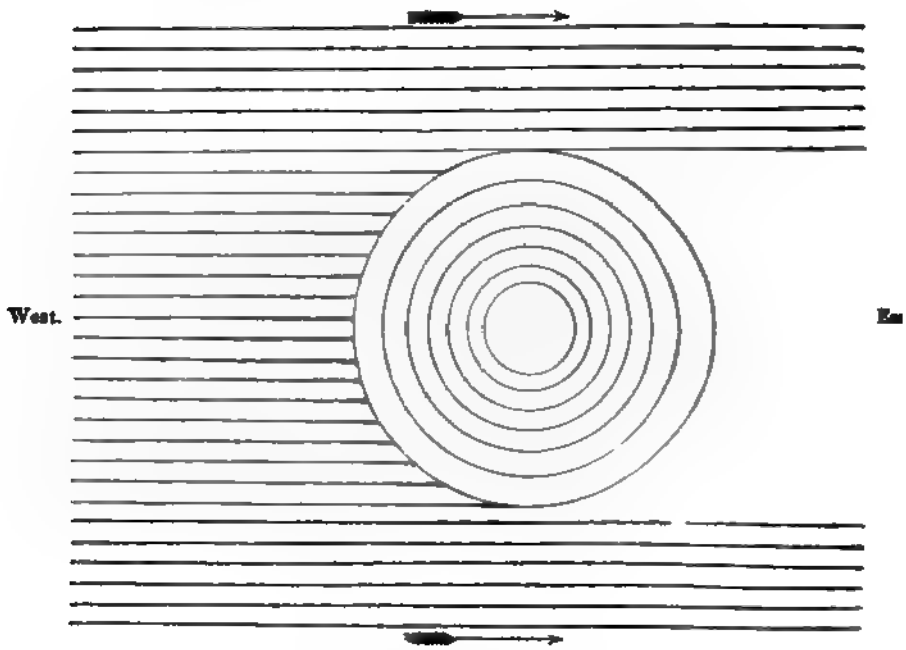
This may have been the case on the 13th August, 1837, since the sympiesometer had sunk as low as 28.50, and the black appearance was to the *westward* of the ship before the wind blew hard.

A progressive whirlwind, of great extent, might have the effect of arresting the usual atmospheric current, and of heaping it up to a sufficient extent on one side of the storm, so as to affect the barometer, by increasing the atmospheric pressure; whilst on the opposite side of the same whirlwind, the atmospheric pressure, beyond the limit of the storm, might be found to be somewhat less than ordinary.

The following diagram is intended to render this explanation more easy. The circle is intended to represent an extended storm in high latitudes; and the parallel lines the prevailing westerly atmospheric current.

The same figure may also serve to explain why

CHAP. XII. progressive revolving storms are often preceded by calms; and why a rise in the barometer may sometimes precede the setting in of a storm.



Every policy of insurance should bind the owners or masters of a ship insured to provide a barometer: and the protest should show that the barometer was registered at least once during every watch. But it ought to be registered oftener; and, within the tropics during the hurricane season, every time the log is heaved.

Many of the sympiesometers are made too short; for which reason this sensitive and valuable instrument may fail at the moment it is most wanted. Thus, the oil of the sympiesometer of H. M. brig Racer, commanded by Captain James Hope, on the 29th of September, 1837, retired altogether from the column into

the well; and then a bubbling was observed through the oil, which was no doubt the escape of the hydrogen gas, owing to the high temperature and diminished atmospheric pressure acting conjointly. The number 12 had been entered on the log-board to denote the wind's force. Soon after this, though under bare poles at the time, the Racer upset, and was only saved by her masts giving way in about two minutes. She was running at the time, with the wind two points abaft the beam on the starboard side, and she went over until her tops struck the waves. It is supposed to have been the sea, rather than the wind, which upset the Racer, for she was struck by a second wave before she recovered the lurch caused by the first. Her ballast had also been diminished as her water was nearly out, having at the time only eleven tons instead of forty-four. This shows the value of the precaution some naval officers adopt, of filling the iron water-tanks with salt water as the fresh is expended.

The barometer will enable us to distinguish that deceitful calm, which is only a lull in the midst of a storm, from a calm arising from other causes; since the barometer stands lowest near the centre of a storm. On the contrary, when the barometer stands unusually high, and a calm ensues, such a calm may be the prelude to a gale; but a ship would then be upon the verge of a storm, instead of in its centre.

Calms.

Calms will probably be found to be intimately connected with gales; for a rotatory storm must no doubt

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influence the atmosphere around it. Thus if a shi in high northern latitudes were on the east or north-east side of a storm coming from the west, we might expect the prevailing westerly wind to be suspended, and a calm to ensue, until a southerly breeze should give the next indication of an approaching gale, which a fall of the barometer would confirm.

If, however (being still on the east side), a ship should happen to be opposite to, and first fall into that portion of a gale which is nearest to the equator, and in which the wind blows westerly, then instead of a calm, the westerly breeze (if such previously prevailed) would probably increase; the appearance of the weather might threaten a storm; the barometer sink a little, and the wind even blow hard from the westward; but if such a breeze should be found to veer, then the barometer might be expected to rise after the wind became due west, and soon afterwards to abate to its former force.

In south latitude this order would be reversed.

The calms which are so frequent on the borders of the trade winds, and those light and fluctuating winds, about the 30th degree of latitude, termed "*The Variables*," seem to be owing to such causes as those just mentioned. The trade winds might there prevail, were it not that rotatory gales, moving eastward between the 30th and 40th degrees of latitude, extend their influence within the limits usually assigned to these variable winds, and, balancing the easterly breeze, first cause calms, and then reverse the wind.

Diminished Atmospheric Pressure.

It has been stated, at page 42, Chap. IV., that the diminished atmospheric pressure in hurricanes may be one of the causes of great inundations during storms; and I regard this as a very curious field of inquiry.

In most detailed accounts of great hurricanes near the sea, statements are found of extraordinary high tides occurring at the time. We read instances of great disaster from inundation, which lead to the belief such occurrences could not take place without the agency of some very powerful cause yet unexplained. Thus, on the 21st of October, 1831, three hundred villages, with ten thousand inhabitants, were swept away by an inundation at the mouth of the Hooghly. And, on the 21st of May, 1833, near the same place, when the sea rose several feet higher than is reported in the gale of 1831, it is stated, in the "Asiatic Journal" of November, 1833, that fifty thousand people were drowned.

We have the authority of the learned secretary of the Bengal Asiatic Society, Mr. James Prinsep, for observations that, at this time, the barometer fell upwards of two inches; and that the oil in the sympiesometer retired entirely from the tube.

The Intendant of Martinique, in making his report upon that island to the French government, in 1780, says, "the sea was more destructive than the wind; in the suburb of St. Pierre the surf rose twenty-five feet." And in the same report, speaking of St. Vincent, which then belonged to the French, he says,

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"In Kingston, out of six hundred houses, only fourteen were left." The Jamaica reports state, that in that year Savanna-la-Mar was entirely submerged.

At St. Vincent, in 1833, various marks on the shore, showing that the sea had risen twelve feet during the hurricane of 1831, and overflowed the roads below that level, remained distinctly visible. From the narratives of Mr. Williams, it is seen that similar effects occur in the South Sea Islands. He states that, after having moved his vessel forty or fifty yards from the sea, to what he thought a place of security, the sea notwithstanding reached it, and lifted the vessel several feet.

During the Bermuda hurricane in 1839, the sea was observed to rise more than two feet higher than usual at a spot which was not only on the leeward side of the island, but within the camber of the dock-yard; neither did the tide at this place ebb as usual.

I was told by Sir Thomas Hastings, that he had observed the ebbing tide in Portsmouth harbour suspended during a rapid fall of the barometer, and begin again to flow; which he ascribed to the influence of diminished atmospheric pressure. A fall of two inches in the barometer indicates a diminution of a fifteenth part of the atmospheric pressure, which would cause water to rise a little more than two feet.

If a revolving power, like a whirlwind, were the only one exerted, it might be expected that the level of the water would be diminished at the centre of the vortex, though heaped up towards the verge of the storm. But it may be possible, that a wave of a round or oval form, moving onward like a tidal wave, but at the rate of the storm's progress, may accompany

the storm in its course, and that its height may depend on the degree of atmospheric pressure, modified by the revolving power of the wind. The impulse in the direction of the storm's course being given, and maintained for a few hundred miles, currents, very similar to the ordinary currents of the tidal wave, might be created: so that if the effect produced by such a wave is added to the spring-tides, it might assist in causing those inundations in flat lands which often occur in violent storms. It will, therefore, be very desirable to note the height to which the tides rise on the leeward side of islands, particularly those lying at a distance from and uninfluenced by continents.

After the storm of September, 1839, Mr. Hurst, of the brigantine Queen Victoria (whose place is marked in the chart), found the current of the Gulf Stream neutralized: and the same commander, on another occasion, found the current running to the westward; a fact corroborated by other printed statements at the time.

The storm of 1839, when crossing the Gulf Stream, was probably five hundred miles in diameter; and a diminished pressure, amounting to a fifteenth part of the atmosphere, at the centre of a moving circle of this extent, seems adequate either to arrest or to accelerate existing currents, or create new ones.

The width of the Bay of Bengal, contracting gradually, does not much exceed half the circumference of the greatest storms on the 20th degree of north latitude, so that an attendant wave, during a great hurricane coming from the south, might be expected to deluge the low countries at the mouths of the Ganges.

This part of the subject deserves the attention of engineers, whilst constructing breakwaters in the sea.

Rollers at St. Helena and Ascension.

At the island of Ascension, as well as St. Helena, there are no storms; but at both these places a very heavy swell occasionally sets in, which the inhabitants call "rollers."

These rollers are said to come from leeward, which is there the north-westward. There has been much speculation as to what can cause this sudden swell of the sea; some believing it to be owing to volcanic action, and others supposing it to be the ground swell occasioned by distant storms. It is said that the rollers not unfrequently continue for a whole day.

In the narrative of Mr. Williams (a missionary in the South Seas), a similar swell of the sea is described. Speaking of Tahiti, he says,—"Mostly once, and frequently twice in the year, a very heavy sea rolls over the reef, and bursts with great violence on the shore: but the most remarkable feature, in the periodical high sea, is, that it invariably comes from west, or south-west, which is the opposite direction to that from which the trade-wind blows. The eastern sides of these islands are, I believe, uninjured by these inundations."

When the swell, proceeding from a hurricane, rolls against the east side of an island, within the tropics, some part of the storm which causes it will usually pass over that island: but a distant storm may pass on either side, sending only its swell upon the shore.

It should be observed whether these rollers, by

setting in during the season of hurricanes, are connected with them; for if connected with the seasons, they cannot be volcanic. The exact direction from whence the swell comes at its beginning, as well as at its end, should be noted; for if the swell be caused by passing storms, it will assist us in approximating to the direction in which the storms pass, and be a guide in searching for vessels which may have encountered them.

*Ripplings in the Straits of Malacca.**

A disturbance of the surface of the sea of a different kind has been observed in the Straits of Malacca, which is not easily accounted for; and I shall here insert Horsburgh's description of it, in the hope that it may create inquiry and observation.

"In the entrance of Malacca Strait, near the Nicobar and Achen Islands, and betwixt them and Junkseylon, there are often very strong ripplings, particularly in the south-west monsoon; these are alarming to persons unacquainted with them, for the broken water makes a great noise when a ship is passing through the ripplings in the night. In most places, ripplings are thought to be produced by strong currents, but *here* they are frequently seen when there is no perceptible current. Although there is often no perceptible current experienced, so as to produce an error in the course and distance sailed, yet the surface of the water is impelled forward by some undiscovered cause. The ripplings are seen, in calm weather, approaching from a distance, and in the night their noise is heard a considerable time before they come near; they beat against the sides of a ship with great violence, and pass on, the spray sometimes coming on deck; and a small boat could not always resist the turbulence of these remarkable ripplings."

* See page 7 "Progress of the Development of the Law of Storms," for further observations on this curious subject.

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The following is an account of the ripples in the Straits of Malacca, which were met with by Captain Basil Hall, R.N.:—

"In H.M.S. Minden, in September, 1834, we just noticed the ripples, when about half-way between Poolo-Penang and the Nicobar Islands; and they continued from that place to the passage between Nicobar and Poolo-Way, off the north end of Sumatra.

"They were always of several miles in length, and in general from two to three and four hundred yards across; they stretched from the northward to the southward; and they all proceeded towards the east and north-east. The ripple has much the appearance of a flat sandy shore, just covered by the water, and breaking to a considerable distance from the beach. The waves curl and break uniformly towards the east or north-east, that is towards the point of the compass to which the whole ripple is advancing. There is this difference between the ripple and the breaking on the flat shore, alluded to above, viz., that the ripple has not such long equal waves, but breaks shorter, and splashes the water up, in a manner different from that produced by the regular curl and dash of the beach wave. It has more the appearance of a '*race*.'

"They differ very much in the magnitude of their waves. Some are quite gentle, and scarcely whiten the surface, and create only a low noise; others foam and dash, so as to shake the ship very sensibly, and even to throw the water up many feet. The noise of these is considerable, and is heard at night from some distance. As we approached the line joining the Achen and Nicobar Islands, the ripples became more frequent and violent. On the 5th of September, one passed us every quarter of an hour, on an average. The wind during the days on which these phenomena were most remarkable, was between east and north-east, very light, and shifting about. By means of chronometers and good latitudes, the ship appeared to have been set to the north-west, somewhat less than one mile an hour (0.79 miles N.W. by W.). There was no bottom at eighty fathoms.

"The following attendant circumstance is curious. On the evening of the 3rd of Sept., the wind was very light from north-east by north. The ship's head west-south-west, and the rate of sailing 1½ miles an hour. It was remarked, that whenever

the ripple touched the ship, or rather when the ship was completely in it, the wind uniformly freshened. Upon watching this phenomenon, it was distinctly made out, that, at the same time with the wind's freshening, a change occurred in its direction. Before entering the ripple, the wind was north-east by north. 'On entering it, it appeared to blow from about north. The exact difference in the angle could not be ascertained, though a considerable difference was manifest.'"

Captain Basil Hall is of opinion that this might only have been an apparent shift of wind, caused by the ship drifting in the current.

For the following I am indebted to an officer of the Royal Navy:—

"Between the years of 1829 and 1833, I was attached to Mauritius and its dependencies, in two brigs (the Jaseur and Badger), and whilst cruising amongst the various coral islands between Madagascar, about 72° east longitude, within the tropics, I have more than once passed through a complete circle of breakers, having the appearance of a reef of rocks, generally in a moderate breeze, and the spray was thrown over, so as slightly to wet the deck; the centre of this circle was perfectly smooth and free from the least swell even, giving one the idea of a boiling cauldron or a whirlpool, such as is formed by water being forced from under the gate of a mill-pond, having a diameter of from one to two miles: as far as I can remember, no one attempted to account for these at the time, but all appeared to look upon it as a most extraordinary and inexplicable wonder.

(Signed) "F. L. BARNARD."

Naval officers, who have often seen these ripplings, represent them as being met with out of soundings, and in other localities besides the Straits of Malacca.

These ripples are said to be obliterated by such a breeze as would carry a ship two knots an hour, with sky-sails set.

The great height to which the salt water of the sea is sometimes carried up into the air, whether by the

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mere force of the wind driving it as spray, or by some lifting motion, as in the waterspouts, deserves attention. That which follows is an extract from the April report from Barra Lighthouse for the present year (1838), sent me by Mr. Robert Stevenson, the engineer to the northern lighthouses.

"On the 16th, it rained spray and snow all day; so that for a week after we had no fresh water on the island." And Mr. Stevenson adds this note to the report:—"The top of the island, or base of the lighthouse, is 600 feet above the level of the sea."

It had blown a storm, and the height of the barometer was, according to the same report, as follows:—

April, 1838.	Barometer.	Wind.
Saturday 14	9 A.M. 29.30	S W and W breeze
	9 P.M. 28.93	
Sunday 15	9 A.M. 28.80	N W
	9 P M. 28.93	Ditto
Monday 16	9 A.M. 28.94	Ditto
	9 P.M. 28.96	Ditto
Tuesday 17	A.M. 29.20	N N W
	P.M. 29.34	North

When the tracks are examined which storms follow within the tropics, we perceive that they do not take the direction of the trade winds; but, moving obliquely across these winds, they seem to be carried along in higher currents of air. The study of storm tracks may, therefore, help to some knowledge of the upper atmospheric currents. In this part of the investigation aëronauts may assist: through their means it may, possibly, be learned at what altitudes above the earth storms travel. The upper currents of the air have already interested Mr. Green, who has expressed his readiness to give any aid in his power to this inquiry.

During a gale in the North Atlantic, about lat. 40°, in a ship hove-to, on the clouds breaking sufficiently to see through the lower ones, I observed the upper light clouds in a quiescent state, as if the storm was confined to an altitude little above the surface of the globe.

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*Rule for Laying Ships to in Hurricanes.**

That tack on which a ship should be laid-to in a hurricane has hitherto been a problem to be solved; and is one which seamen have long considered important to have explained.

In these tempests, when a vessel is lying-to, and the wind veers by the ship's head, she is in danger of getting sternway, even when no sail is set; for in a hurricane the wind's force upon the masts and yards alone will produce this effect, should the wind veer ahead; and it is supposed that vessels have often foundered from this cause.

When the wind veers aft, as it is called, or by the stern, this danger is avoided; and a ship then *comes up* to the wind, instead of having to *break off* from it.

If great storms obey fixed laws, and the explanation given of them in this work be the true one, then the rule for laying a ship to follows like the corollary to a problem already solved.

In order to define the two sides of a storm, that side will be here called the right-hand semicircle which is on the right of the storm's course, as we look in the

* In "The Progress of the Development of the Law of Storms" this rule is carried out further. It is there shown that the *port tack* leads a ship when north of the equator towards the storm's vortex; and that the starboard tack leads a ship when south of the equator towards the storm's vortex.

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direction in which it is moving; just as we speak of the right bank of a river.

The rule for laying a ship to will be, when in the *right-hand* semicircle, to heave-to on the *starboard* tack; and when in the *left-hand* semicircle, on the *larboard* tack, in both hemispheres.

The first of two figures inserted here is intended to represent one of the West Indian hurricanes, moving towards the north-west by north, in the direction of the spear drawn obliquely. The commander of a ship can ascertain what part of a circular storm he is falling into by observing how the wind begins to veer. Thus, in the first figure, the ship which falls into the left-hand semicircle would receive the wind at first about east by north; but it would soon veer to east, as the storm passes onwards. The ship which falls into the left-hand semicircle would at first receive the wind at north-east; but with this latter ship, instead of veering towards east, it would veer towards north.

The explanation of the rule will best be made out by attentively inspecting the two figures. In both, the black ships are on the proper tacks; the white ships being on the wrong ones.

The second figure is intended to represent one of those hurricanes in south latitude which pass near Mauritius, proceeding to the south-westward. The whirlwind is supposed to be passing over the vessels in the direction of the spear head. It will be seen that the black ships are always coming up, and the white ships always breaking off; and that they are on opposite tacks on opposite sides of the circles. Thus, the Astrea, commanded by the late Sir C. Schomberg, was on the proper tack on the 20th of March, 1811;

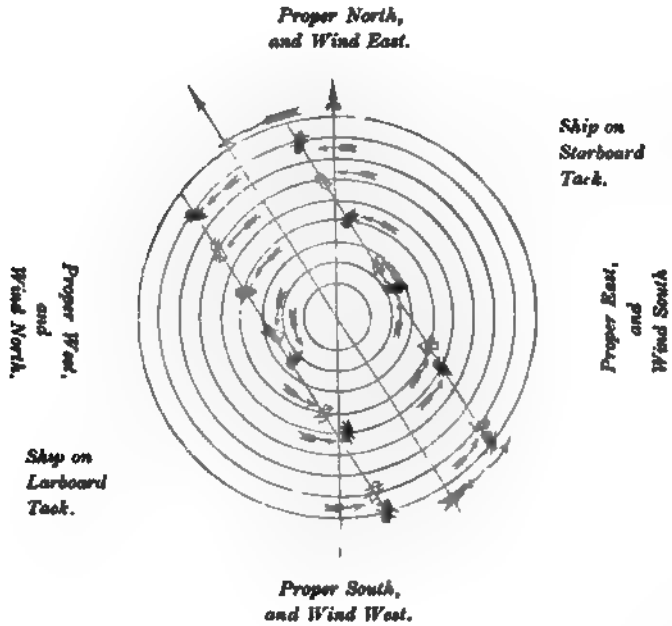

Figure for the northern hemisphere.

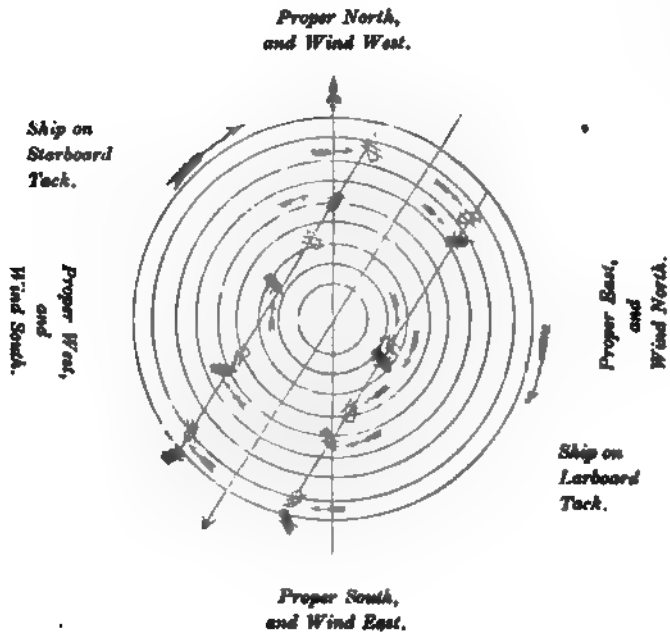

Figure for the southern hemisphere.

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and an inspection of the log of that ship, at page 246, will show how gradually she came up; but the Buccleugh, on the 22nd of January, 1834, having had the wind from east-south-east, veering to south, and then to south-south-west, thereby proving her to be in the right-hand semicircle of a storm moving southerly, was in the wrong position when laid-to on the larboard tack. Had she been on the other tack, the wind in veering would have drawn aft; then, perhaps, she would not have lain so long "with her broadside in the trough of the sea, and with her lee-waist full of water." This will frequently be found to bring a ship's head to the sea; for the wind veers round faster than the swell changes its direction.

If hurricanes were to move in the opposite course to that which they have hitherto been found to follow, then would the rule be reversed; for the white ships would come up, and the black ships break off.

Practical observations.

It can require no comments to point out, that if the wind in storms follows a fixed law, much advantage may be gained by the knowledge of that law.

In following the tracts of storms here detailed, we find that the hurricane drawn on Chart VI. passed over the Island of Antigua in six hours. Yet the ship Judith and Esther, not far from that island, was twenty-four hours in the same storm; for that ship ran along with it; and many other instances of the same nature occur in this inquiry.

If one side of a storm be to a ship in her voyage a foul wind, the opposite side of the same storm would be a fair one. Thus, within the tropics in the Indian Ocean, the left-hand semicircle is a fair wind for ships in their voyages from India to the Cape of Good Hope,

whilst the right-hand side will assist the voyages of outward-bound ships: but there is this important difference, that in the first case ships would carry the fair wind with them; whereas in the other semicircle, owing to the ship sailing in the contrary direction to the progression of the gale, she would have the benefit of it during a short time only. Thus, if a hurricane coming from the eastward were passing over Mauritius, moving at the rate of ten miles an hour, and a ship sailing eastward were to fall into the side of the storm next the equator, and to run at the rate of ten knots an hour, the ship and storm would pass each other in half the time in which the hurricane would pass over the island, since they would be travelling at the same rates, but in opposite directions.

In the 12th edition of the "American Coast Pilot" will be found some practical rules, by Mr. Redfield, applicable to ships meeting storms in the North Atlantic; and all I have collected proves that these rules are correct. That a seaman may be able to apply them, however, requires that he should study the subject, and understand the principle.

The annexed note, written in 1842, when at Bermuda, is inserted as an instance to show how the theory of storms may be applied in aid of navigation.

Note on the Winds, as influencing the Courses sailed by Bermuda Vessels.

In high latitudes the atmospheric currents, when undisturbed, are westerly, particularly in the winter season. If storms and gales revolve by a fixed law, and we are able, by studying these disturbing causes of the usual atmospheric currents, to distinguish revolving gales, it is likely that voyages may be shortened.

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The indications of a revolving gale are, a descending barometer, with a regularly veering wind.

In a voyage from Bermuda to New York, in the winter, strong westerly winds, together with the Gulf-stream, would carry vessels attempting to sail direct to New York to the eastward of their course. No doubt all seamen are aware of this, and do in consequence make some allowance by keeping to the westward. But according to the usual practice, on an east wind overtaking them, they would steer in a direct course for their destined port, making allowance only for the current, as the wind would be considered a fair one. If, however, the gale were a revolving one, the wind, at first easterly, would veer until it became westerly; and would probably blow from the westward with increased force, when the vessel would be carried off her course. It is, therefore, a subject deserving consideration, whether advantage should not be taken of the temporary east wind in order to run to the westward, nearly as far as the meridian of Cape Hatteras; so that, in the rest of the voyage to New York, the chance of reaching that port would be the same as that of coasting vessels in their voyage from the Carolinas.

But should a dry easterly wind set in, and the barometer maintain its mean height, or rise above it, the case would be altogether different; for these would be indications of a steady wind and not of a revolving gale. The ship may then be steered direct for the intended port; and this shows that the hygrometer might prove a useful instrument at sea, though not hitherto used, that I am aware of, in aid of navigation.

Since vessels sailing from Bermuda, and bound to New York, or the Chesapeake, must necessarily cross the Gulf-stream, they will have the advantage in doing so before that stream begins to set strongly to the eastward. For this reason, as well as to have a better chance of getting to the westward, it would seem advisable on first leaving Bermuda to make no *northing;* but if the wind should at the time blow, for example, from the north-west, to sail free upon the starboard tack, and to keep on this tack until the vessel be so far advanced as to fall into the northerly current of the Gulf-stream; and this might prove to be the best course to pursue, even should the ship for a time make *southing*. The more southerly the port to be gained, as for example Baltimore, the more does it appear advisable that this should be persevered in. The same principle of sailing for Boston, and even for Halifax (though in a much less degree), might be found to be

that by which the most certain course would be secured. It may appear unreasonable to propose, that a ship bound to a port to the *northward* should, on leaving Bermuda, steer *southerly*; yet, when we shall be better acquainted with the causes of the variable winds and their changes, this may really not appear to be so unreasonable.

For example, towards the end of a revolving gale passing over Bermuda, the wind may still be west, and blowing hard. Since the courses of such gales are northerly, a ship by steering north would only continue the longer in the same westerly gale, whereas by steering southerly a ship and the storm would be moving in opposite directions, and the vessel would the sooner have the chance of falling into a new variation of the wind. Sailing southerly, on the starboard tack, the latter end of such revolving gales as the one supposed above might (as frequently happens) veer to the *west-north-west* and even to *north-west*, which would enable a ship to come up and make a better course towards the west.

These suggestions are offered to practical seamen, in the hope that some persons will be induced to consider this subject; and, if gales really revolve, that advantage may be taken of their mode of action.

In sailing from the West Indies to Bermuda, in the winter season, the trade wind will generally enable vessels to gain a meridian sufficiently to the westward, before they leave the latitudes where it usually blows; and in winter it would seem desirable to make the 68th or 70th degrees of west longitude, before leaving the 25th of latitude.

In voyages between Bermuda and Halifax, in the winter season, the same reasons hold good for keeping to the westward as have been recommended for the passage from the West Indies to Bermuda, but in a much greater degree; for in this latter case there is not the easterly trade wind to carry ships to the westward. On the contrary, the west wind may blow throughout, whilst the Gulf-stream also would tend to set vessels to the eastward. The degree of westing to be made in this passage in the different seasons does not seem to be agreed upon

The chief object, however, of this Note is to point out the benefit which may be derived from profiting by the east winds, which blow on the north side of a revolving gale *in north latitude*, before the gale shall veer to the westward.

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Ships leaving ports in North America for Europe will have a fair wind when half a storm shall have passed, for the wind will then become westerly; and, if they are bound to the north of Europe, they may run in the gale and make a rapid voyage. When ships sail from England the reverse will usually be the case. If a south-east wind set in, it may veer by the east towards north-east, and thus be a fair wind also (which would imply that the centre was passing to the southward); but if, instead of easterly, the wind should become more southerly, accompanied with gusts, and veer rapidly, whilst the barometer should fall fast, then a gale which would be a foul wind for crossing the Atlantic towards America may be expected to follow. This difference arises from the storms of high latitudes in the northern hemisphere having generally a north-easterly progression.

When storms recurve in either hemisphere, and cross the tracks of ships, the practical application of such knowledge as we have gained becomes more complicated. This will frequently happen to ships on their homeward voyage from India, and as they cross the meridians of the islands of Mauritius and Bourbon, about the 25th degree of south latitude. This may be a reason why the neighbourhood of these islands is so much dreaded; for the Mauritius hurricanes, instead of originating there, appear to come from the eastward.

If two ships, one in each hemisphere, were sailing west, and each met storms after they had recurved, the centres of both of which storms were also on the same parallels of latitude as the ships, the vessel in north latitude would meet the wind at south, and that in south latitude would meet the wind at north. Each

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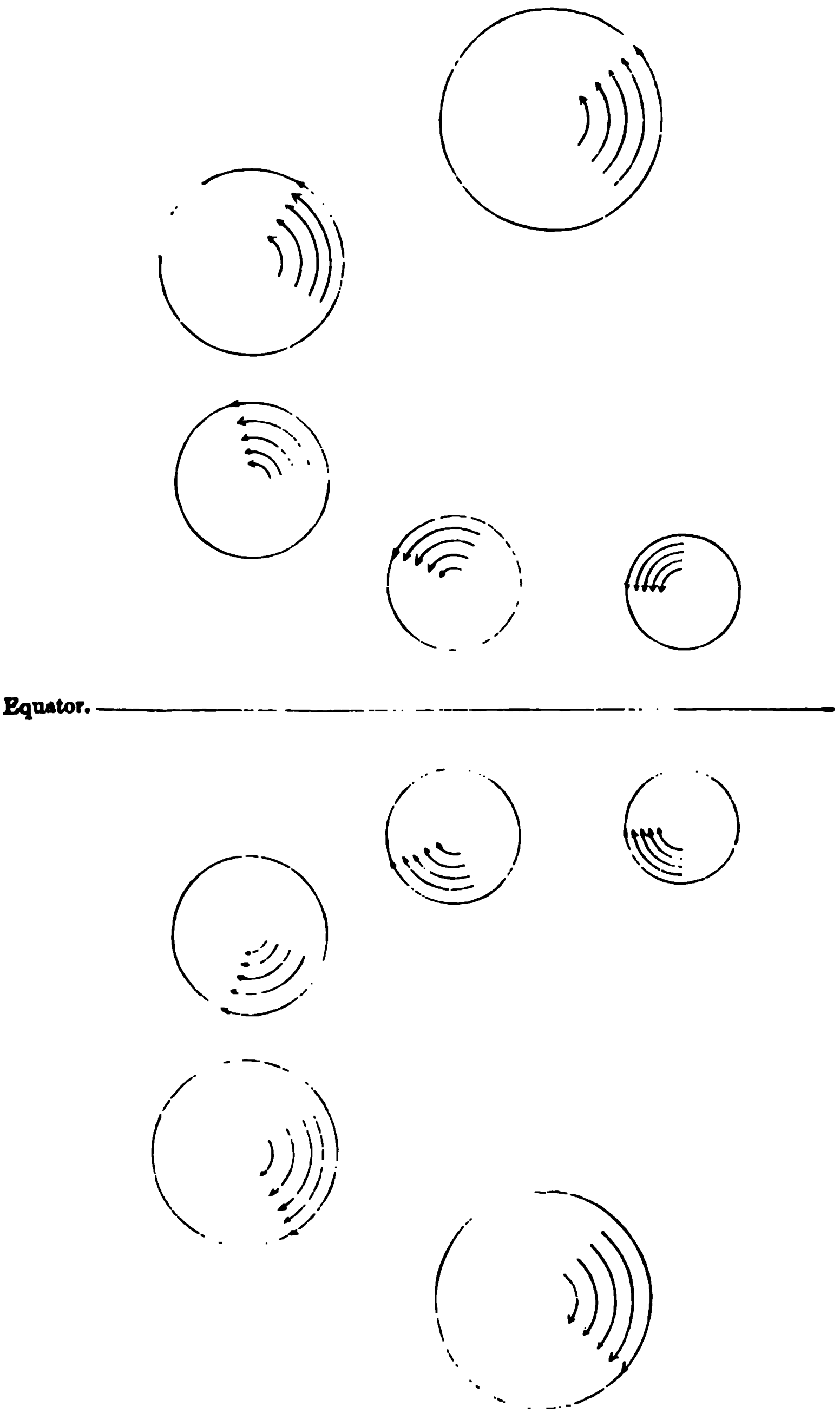
Quadrant of greatest danger.



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ship would be most likely to avoid the storm by putting her head towards the equator: but they would be on opposite tacks. The ship in north latitude would be on the starboard tack, the ship in south latitude on the larboard. In both cases the wind would veer towards west, and both ships would come up until the storms passed by them, in their progress towards their proper poles; after which the wind might be variable.

It is a point which has been often discussed, whether a ship should scud or not in a hurricane.

In a revolving storm there will be one quadrant in which it will be more dangerous for a ship to scud than in the other three; that being the one in which a vessel driven by the wind would be led in advance of the centre of the storm's track; whilst to scud in the opposite quadrant would tend to lead a ship out of the hurricane.

The preceding diagram, in which the quadrants of greatest danger are shaded, will serve to explain for both hemispheres what is here meant. Within the tropics, whilst the course of storms tends towards the west, the quadrants of greatest danger will be on the sides of the storm next the poles; but these quadrants will gradually change their position as the storms recurve; and in high latitudes, after the courses of storms become easterly, these quadrants will be on the sides next the equator.

The four East India Company's ships which foundered in the Culloden's storm were, from the accounts, scudding in the most dangerous quadrant of the storm when last seen.

The storm tracks here traced are far from sufficient

in number to afford that knowledge of the winds at which we are now capable of arriving. My object has been to prove, that the subject deserves the attention of abler men than myself, and that we have hitherto studied meteorology in far too confined a sphere. Since our own country is too limited for the comparisons required, nations should combine to study the atmospheric laws. The lighthouses along the coasts of the civilized world might exchange their observations for this end. The great steam navigation companies might place their log-books where easy reference could be made to them; and in the Pacific Ocean many useful observations be made by the large body of Englishmen settled there as missionaries.

I have much satisfaction in making known what has been done towards carrying on this investigation, since the first edition of the work was published; and it is proper that those who are desirous of further aiding in the inquiry should be made acquainted where additional sources for obtaining information are now opened, and where reports are collecting. I am the more desirous of making this publicly known, because my object throughout has been to endeavour to induce others to follow up the subject, as one which can only be greatly advanced by the combined observations of many.

The Trinity Board, who have always been desirous of giving every support to the inquiry, have now ordered more careful observations to be made at the lighthouses.

The Inspector-General of the Coast-guard, Capt. Bowles, issued orders to the revenue cruisers to keep hourly observations on the weather, both by night and day.

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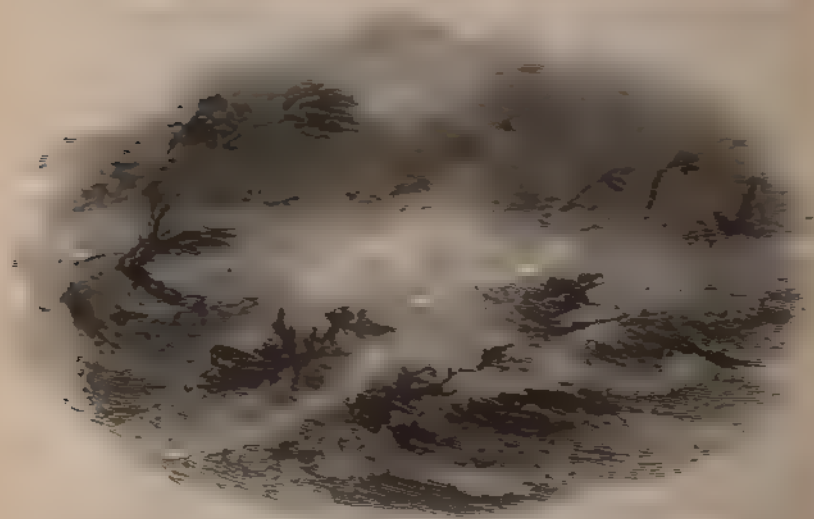
The late Secretary of State for the Colonies, Lord Glenelg, sent instructions on the subject to all the British colonies; and extracts from the information obtained will be deposited in the Colonial Office for reference.

The Lords Commissioners of the Admiralty have drawn the attention of the officers of the British navy to the subject; and have caused a new form of log-book to be adopted, with a view of recording all meteorological phenomena at the moment it is observed. The log-books of ships of war are lodged at Somerset House, in charge of the Accountant-General of the Navy: and I have always found every facility given towards consulting them.

Steps have also been taken, which I trust will be successful, to induce foreign nations to interest themselves in this inquiry. A more perfect knowledge of the subject will facilitate international communication, which it is to be hoped is for the good of mankind.



Mouth of the Hooghly, 1st May, 1853 (see p. 79): *from a Drawing descriptive of the Inundation, by Mr. Huggins.*

APPENDIX.

POPULAR EXPLANATION OF THE BAROMETER AND SYMPIESOMETER.

The barometer is a measure for the weight of the atmosphere, or its pressure on the surface of the globe. It is well known that it is owing to the atmospheric pressure that water rises in a common pump, after the air has been drawn from the barrel; but that the height to which it can be raised by this means is limited, and not much exceeds thirty feet. A little more than thirty feet of water, therefore, balances the atmosphere. Mercury being about twelve times heavier than water, about thirty inches of mercury will also counterpoise the atmosphere. The principle of the barometer is simple. If a tube, about three feet long, closed at one end and open at the other, be filled with mercury, and, with the open end stopped by a finger, this tube be reversed, and placed upright in a cup partly filled with the same liquid, the mercury in the tube, in ordinary states of the weather, will descend to thirty inches, measured from the surface of the fluid in the cup, and not much lower. The mercury is sustained in the tube by the pressure of the atmosphere on the surface of the fluid in the cup. Such a tube and cup, so filled, would in fact be a barometer; and if a moveable index were added to it, this simple instrument would indicate the changes which take place in the atmospheric pressure. The sympiesometer is a more delicate instrument for measuring the atmospheric pressure; but it is also a more complicated one than the mercurial barometer, and it would be best understood by inspection. The upper part of the tube contains hydrogen-gas, which is elastic; and the lower part, including the well, contains oil. By this compound construction, whilst the length of the tube is less than that of the mercurial barometer, the index, or scale, for measuring the pressure is increased. Hydrogen-gas being very sensibly affected by all changes of temperature, the index, by which the atmospheric pressure is read, requires to be set according to the actual temperature, before the atmospheric pressure can be read off.

Since mercury expands by heat, a correction for temperature is also required for the mercurial barometer, when exact calculations are to be made; and for this reason barometers usually have a thermometer attached to them, in order that the temperature may be read off, and recorded at the same time that the barometer is registered.

The following table of the correction to be applied to the observed height of the mercury, to reduce it to the freezing point, at 32° Fahrenheit, or zero of the centigrade scale, has been extracted from Galbraith's "Barometric Tables," published in 1833.

Reduction of the English Barometer to the Freezing Point, or to 32° on Fahrenheit's Scale.—*Subtractive.*

Temp.		Part I.—For Mercury only. Height of the Barom. in Inches.				Part II.—Mercury & Brass. Height of the Barom. in Inches.				Diff. to 1 Inch.
Fah.	Cent.	28 In.	29 In.	30 In.	31 In.	28 In.	29 In.	30 In.	31 In.	
32°	0°.00	0.0000	0.0000	0.0000	0.0000	0.0088	0.0091	0.0094	0.0097	2
34	1.11	0.0056	0.0058	0.0060	0.0062	0.0138	0.0143	0.0148	0.0152	5
36	2.22	0.0112	0.0116	0.0120	0.0124	0.0188	0.0194	0.0201	0.0208	7
38	3.33	0.0168	0.0174	0.0180	0.0186	0.0238	0.0246	0.0255	0.0263	9
40	4.44	0.0224	0.0232	0.0240	0.0248	0.0288	0.0298	0.0309	0.0319	11
42	5.55	0.0280	0.0290	0.0300	0.0310	0.0338	0.0350	0.0362	0.0374	12
44	6.66	0.0336	0.0348	0.0360	0.0372	0.0388	0.0402	0.0416	0.0430	14
46	7.77	0.0392	0.0406	0.0420	0.0434	0.0438	0.0454	0.0470	0.0485	16
48	8.88	0.0448	0.0464	0.0480	0.0496	0.0488	0.0506	0.0523	0.0541	17
50	10.00	0.0504	0.0522	0.0540	0.0558	0.0538	0.0558	0.0577	0.0596	19
52	11.11	0.0559	0.0579	0.0599	0.0619	0.0588	0.0609	0.0630	0.0652	21
54	12.22	0.0615	0.0637	0.0659	0.0681	0.0638	0.0661	0.0684	0.0707	23
56	13.33	0.0671	0.0695	0.0719	0.0743	0.0688	0.0713	0.0738	0.0762	25
58	14.44	0.0727	0.0753	0.0779	0.0805	0.0738	0.0765	0.0791	0.0818	26
60	15.55	0.0783	0.0811	0.0839	0.0867	0.0788	0.0817	0.0845	0.0873	28
62	16.66	0.0838	0.0868	0.0898	0.0928	0.0838	0.0868	0.0898	0.0928	30
64	17.77	0.0894	0.0926	0.0958	0.0990	0.0888	0.0920	0.0951	0.0983	32
66	18.88	0.0950	0.0984	0.1018	0.1051	0.0938	0.0971	0.1005	0.1039	34
68	20.00	0.1005	0.1041	0.1077	0.1113	0.0988	0.1023	0.1058	0.1094	36
70	21.11	0.1061	0.1099	0.1137	0.1175	0.1037	0.1075	0.1112	0.1149	38
72	22.22	0.1117	0.1156	0.1196	0.1236	0.1087	0.1126	0.1165	0.1204	40
74	23.33	0.1172	0.1214	0.1256	0.1298	0.1137	0.1178	0.1218	0.1259	42
76	24.44	0.1228	0.1271	0.1315	0.1359	0.1187	0.1229	0.1272	0.1314	44
78	25.55	0.1283	0.1329	0.1375	0.1421	0.1237	0.1281	0.1325	0.1369	45
80	26.66	0.1339	0.1387	0.1434	0.1482	0.1286	0.1332	0.1378	0.1424	47
82	27.77	0.1394	0.1444	0.1494	0.1544	0.1336	0.1384	0.1432	0.1479	49
84	28.88	0.1450	0.1502	0.1553	0.1605	0.1386	0.1435	0.1485	0.1534	51
86	30.00	0.1505	0.1559	0.1613	0.1667	0.1435	0.1486	0.1538	0.1589	53
88	31.11	0.1561	0.1616	0.1672	0.1728	0.1485	0.1538	0.1501	0.1644	54
90	32.22	0.1617	0.1674	0.1731	0.1790	0.1535	0.1589	0.1644	0.1699	56
P. P. for		0°.4	0°.8	1°.2	1°.6	2°.0	0°.4	0°.8	1°.2	1°.6	2°.0	
Temp. F. +		12	21	35	47	59	10	21	31	42	52	

The atmosphere is supposed to extend to about the height of fifty miles; and its density to diminish from the surface of the globe upwards, in a geometrical ratio.

Thus when observations are made on land, above the level of the sea, a correction is required for altitude, since the weight of the atmosphere diminishes as we ascend. It is owing to this that we are enabled to determine the height of mountains by barometers; and that aëronauts compute the altitude to which they ascend in balloons.

If any fluid in a cup be put into rapid circular motion, we should have a representation of the form that portion of the atmosphere assumes which is within the limits of a storm; the most depressed part of the fluid would represent the centre of the gale where the atmospheric pressure is the least.

The principle of the barometer should be explained in all works on navigation, and in all schools where navigation is taught.

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THE END.

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DIRECTIONS FOR THE BINDER.

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